HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

6.2.8 ES Volume B - Introduction to the environmental assessments B8 - Surface water and groundwater

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8 Surface water and groundwater

8.1 Introduction

8.1.1 This chapter provides an introduction to the technical basis for the surface water and groundwater assessment for the Wylfa Newydd Project. It includes a summary of legislation, policy and guidance; key points arising in consultation that have guided the surface water and groundwater assessment; and assessment methodologies and criteria.

8.1.2 The surface water and groundwater assessments are split into three principal components as follows: surface water (hydrology), fluvial geomorphology, and groundwater (hydrogeology).

8.1.3 The surface water assessment includes the parts of the hydrological cycle relating to fresh surface water. Water quantity and quality have an important role in supporting flora and fauna in rivers, lakes and wetlands whilst fresh surface water can be abstracted for supply. Surface water flooding can have a detrimental effect on structures and communities.

8.1.4 Fluvial geomorphology concerns landforms and the processes of erosion and deposition that shape and form river channels and adjacent floodplains. It is also specifically concerned with water and sediment movement in channels. Geomorphology and hydromorphology, which are terms that are sometimes used interchangeably, underpin the Water Framework Directive (WFD) (2000/60/EC) (table B8-1) and are key factors in determining whether a water body can achieve or maintain good status.

8.1.5 Hydrogeology considers the occurrence, movement, distribution and properties of water in soils and rocks, i.e. the water contained below the surface. The terms hydrogeology and groundwater are used interchangeably in this chapter. Groundwater supports rivers, lakes and wetlands, especially through drier periods when there is little direct input from rainfall. Rising groundwater levels can lead to groundwater flooding.

8.1.6 The assessment of effects for surface water and groundwater is included in the following chapters:

- D8 (Application Reference Number: 6.4.8) for the WNDA Development;
- E8 (Application Reference Number: 6.5.8) for the Off-Site Power Station Facilities;
- F8 (Application Reference Number: 6.6.8) for the Park and Ride;
- G8 (Application Reference Number: 6.7.8) for the A5025 Off-line Highway Improvements; and
- H8 (Application Reference Number: 6.8.8) for the Logistics Centre.

8.2 Legislation, policy and guidance

8.2.1 The following legislation, policy and guidance have been used to inform the scope and content of the surface water and groundwater assessment; assist in the identification of potential effects and mitigation; and influence the design of the Wylfa Newydd Project to reduce the significance of effects.

Key legislation

8.2.2 The relevant legislation and how it relates to the surface water and groundwater assessment are set out in table B8-1.

Table B8-1 Summary of key legislation

Legislation	Description
Water Framework Directive (WFD) (2000/60/EC)	This European Union (EU) Directive is European water legislation with the overarching objective of all water bodies in Europe attaining Good or High Ecological Status or Potential by 2027. The WFD is implemented in Wales by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. It establishes a framework for the protection of surface waters and groundwater, such that they obtain 'high' ecological status.
Groundwater Daughter Directive to WFD (2006/118/EC)	This Directive establishes specific measures as provided for in Article 17(1) and (2) of Directive 2000/60/EC in order to prevent and control groundwater pollution.
Assessment and Management of Flood Risks Directive (2007/60/EC)	This EU Directive requires Member States to assess watercourses and coastlines at risk from flooding, to map the flood extent and assets and humans at risk. They then need to take adequate measures to reduce the risk.
Environmental Quality Standards Directive (2008/105/EC)	This EU Directive lays down environmental quality standards (EQSs) for priority substances and certain other pollutants as provided for in the WFD, with the aim of achieving good surface water chemical status.
Priority Substances (Amendment) Directive (2013/39/EU)	This EU Directive amends Directives 2000/60/EC and 2008/105/EC as regards priority substances used in the setting of water policy.
Water Resources Act 1991	This Act aims to maintain and improve the quality of controlled waters. Part II of the Water Resources Act 1991 covers the licencing of surface water and groundwater abstractions.
Water Act 2003	The Act amends the Water Resources Act 1991 and includes provisions to improve long-term water

Legislation	Description
	resource management by changes to the licencing regime and for water companies to publish water resource management plans and place the water companies under an enforceable duty to further water conservation.
Land Drainage Act 1991	The Act requires that a watercourse be maintained by its riparian owner in such a condition that the free flow of water is not impeded. The county and district councils have powers of enforcement.
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017	These Regulations set out objectives for fluvial; lacustrine (lake); groundwater; and coastal water bodies within Wales. These include improving the water environment to achieve good/high status, maintaining existing good/high status and implementing mitigation to support the water environment at a catchment and water body scale. New modifications have to be assessed in line with the legislation and the water body objectives.
The Flood Risk Regulations 2009	These Regulations require regulatory agencies to prepare flood risk and hazard maps, flood risk assessments, to identify flood risk areas and to prepare flood risk management plans.
Flood and Water Management Act 2010	The Act aims to create a simpler and more effective means of managing the risk of flood and coastal erosion. The act also aims to help improve the sustainability of water resources and protect against potential droughts. Provisions include the management of the risk of groundwater flooding.
The Water Supply (Water Quality) Regulations 2010	These Regulations set out standards (based on EU Directives) for the quality of water intended for domestic purposes or for use in a food production undertaking. The standards in environmental assessments are frequently referred to as the “drinking water standards” and are used to determine the relative quality of groundwater and surface water at sites being assessed.
The Water Supply (Water Quality) (Amendment) Regulations 2016	These Regulations amend the Water Supply (Water Quality) Regulations 2010 so as to implement the EU Radioactive Substances in Drinking Water Directive 2013/51/Euratom and add new provisions dealing with the monitoring of radioactive substances.
The Private Water Supplies (Wales) Regulations 2010	These Regulations regulate private water supplies (PWSs) in Wales. Under the Regulations, local authorities have a duty to monitor PWSs in their

Legislation	Description
	area. They must also undertake risk assessments of each private supply that supplies more than one home or is used for commercial purposes. For supplies serving a single home, the owner of the supply may request the local authority to undertake a risk assessment or sample the supply.
The Private Water Supplies (Wales) (Amendment) Regulations 2016	These Regulations amend the Private Water Supplies (Wales) Regulations 2010 so as to implement the EU Radioactive Substances in Drinking Water Directive 2013/51/Euratom and add new provisions dealing with the monitoring of radioactive substances.
The Environmental Permitting (England and Wales) Regulations 2016 (as amended)	These Regulations seek to ensure that authorised activities and their discharges do not endanger the environment or human health; Environmental Permits (EP) must be sought from Natural Resources Wales (NRW) or the Environment Agency. The regulations combine the requirements for an integrated waste management approach and for hazardous waste management. This provides a framework for regulation that enables NRW and the Environment Agency to assess permitting and compliance with a common approach.
The Water Resources (Control of Pollution) (Oil Storage) (Wales) Regulations 2016	These Regulations apply where more than 200 litres of oil is stored above ground at an industrial, commercial or institutional site. Oil must be stored in a container that will not leak or burst and the container must be situated within a secondary containment system.
Environment (Wales) Act 2016	This Act introduces a new approach to sustainable management of natural resources at a national and local level. It introduces a new, enhanced Biodiversity and Resilience of Ecosystem Duty on public bodies to ensure that biodiversity is an integral part of decision making. Public authorities will be required to report on the actions they are taking to improve biodiversity and promote ecosystem resilience.
Water Resources (Transitional Provisions) Regulations 2017	These Regulations introduce the requirement for an abstraction licence from 1 January 2018 for abstractions greater than 20m^3/d and include the requirement for a number of previously exempt abstractions to be licensed.

Key policy

8.2.3 The relevant national and local plans and policies, and how these relate to the surface water and groundwater assessment, are described in table B8-2.

Table B8-2 Summary of key policy

Policy	Description
Overarching National Policy Statement *for Energy (EN-1)* (NPS EN-1) [RD1]	NPS EN-1, designated by the Secretary of State in July 2011, sets out the overarching national policy for delivery of major energy infrastructure projects. The methodology which has been followed in this assessment builds on the guidance set out in NPS EN-1, which states in paragraph 5.3.3: "*Where the development is subject to EIA* [Environmental Impact Assessment] *the applicant should ensure that the ES* [Environmental Statement] *clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity*…". NPS EN-1 sets out the assessment guidance and decision making aspects for the following aspects: • Section 4.10 – pollution control and other environmental regulatory regimes. • Section 5.7 – flood risk • Section 5.15 – water quality and resources. NPS EN-1, paragraph 5.7.5 provides the minimum requirements for flood risk assessment. NPS EN-1 (paragraph 5.15.3) requires applicants to describe and assess the impact on: • existing water quality of waters affected by the project and the impacts on them noting relevant existing discharges, new discharges and changes to discharges; • existing water resources affected by the project; • existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the project and any impact of physical modifications to these characteristics; and • impacts on water bodies under the Water Framework Directive.

Policy	Description
National Policy Statement for Nuclear Power Generation (EN-6) (NPS EN-6) [RD2]	NPS EN-6, designated by the Secretary of State in July 2011, sets out national policy on new Nuclear Power Stations identified as potentially suitable for deployment by 2025. Owing to the coastal and estuarine location of the nuclear sites, NPS EN-6 (see paragraph 3.8.3) also goes on to state the requirement to take account of climate change adaptation measures; assess specific implications of cooling water characteristics for the marine environment; assess the effects on coastal processes, intertidal deposition and soil development. In paragraph 3.9.3 NPS EN-6 states the applicant should also consider effects on the groundwater regime and its effects on terrestrial and coastal habitats. Paragraph 3.9.4 of NPS EN-6 states: "…baseline studies on nationally and internationally important habitats and species that may be affected as a result of the development should be undertaken by the applicant to inform the assessment of the cumulative ecological effects". NPS EN-6 (paragraph 3.6.11) also requires a Flood Consequence Assessment (FCA) in accordance of Section 5.7 of EN-1.
Planning Policy Wales (Edition 9) [RD3]	This Document sets out the land use planning policies of the Welsh Government, forming a strategic framework to guide development.
	Chapter 5 (Conserving and Improving Natural Heritage and the Coast) sets out the Welsh Government's objectives for the conservation and improvement of the natural heritage. Those objectives of relevance to the water environment include to: • promote the conservation of landscape and biodiversity, in particular the conservation of native wildlife and habitats; • ensure that action in Wales contributes to meeting international responsibilities and obligations for the natural environment; and • ensure that statutorily designated sites are properly protected and managed. The chapter then sets out what the regulators' statutory duties are to ensure these objectives are being implemented through the planning process.

Policy	Description
	Chapter 13 (Minimising and Managing Environmental Risks and Pollution) sets out the Welsh Government's objectives for avoiding or minimising the adverse effects of any environmental risks on present or future land use. The Welsh Government's objectives are stated to be to: • maximise environmental protection for people, natural and cultural resources, property and infrastructure; and • prevent or manage pollution and promote good environmental practice. The chapter sets out the Welsh Government's policy for flood risk and development in areas of highest flood risk and dealing with contaminated land such that the development does not impact on the water environment.
Technical Advice Note (TAN) *15: Development and Flood Risk* [RD4]	TAN 15 provides technical guidance that supplements the policy set out in *Planning Policy Wales* in relation to development and flooding. The document advises on development and flood risk relating to sustainability principles and provides a framework within which risks arising from both river and coastal flooding, and from additional runoff from development in any location, can be assessed. This incorporates climate change scenarios. It provides advice on: • the nature of development or land use; • justifying the location of built development; • assessing flooding consequences; • surface water runoff from new development; and • development control. The TAN provides a framework within which risks arising from both river and coastal flooding, and from additional runoff from development in any location, can be assessed.
TAN 5: Nature Conservation and Planning [RD5]	TAN 5 covers nature conservation and planning, and is also relevant to terrestrial and freshwater ecology, providing guidance on the key principles of positive planning for nature conservation. The note provides advice for local planning authorities on:

Policy	Description
	• the key principles of positive planning for nature conservation; • nature conservation in development management procedures; • development affecting protected internationally and nationally designated sites and habitats; and • development affecting protected and priority habitats and species.
TAN 14: Coastal Planning [RD6]	TAN 14 provides guidance on key issues for planning for the coastal zone including flooding. The note provides advice for local planning authorities on: • definition of coastal zones in its area, in consultation with neighbouring authorities; • consideration of effects at both the site and its immediate environs; and • potential effects of developments in coastal zones.
Anglesey and Gwynedd Joint Local Development Plan 2011 - 2026 - Written Statement [RD7]	The Joint Local Development Plan covers the local authorities of the IACC and Gwynedd Council and forms the basis for land use planning in these areas. The Joint Local Development Plan covers the period 2011 to 2026. Within the Plan, the strategic objectives in relation to the water environment are the following. Strategic Objective 6 (SO6): "*Minimize, adapt and mitigate the impacts of climate change".* This will be achieved by, amongst others, *"ensuring that highly vulnerable development is directed away from areas of flood risk wherever possible"* and *"manage, protect and enhance the quality and quantity of the water environment*". Strategic Objective 8: "*Ensure that settlements are sustainable*…". This will be achieved by, amongst others, ensuring "*new developments that are vulnerable to harm will not be located in areas at risk from flooding*". Furthermore, Policy PS 5 (Sustainable development) requires all development proposals to: "*Reduce the amount of water used and wasted; reducing the effect on water resources and quality;*

Policy	Description
	managing flood risk and maximizing use of sustainable drainage schemes; and progressing the objectives of the Western Wales River Basin Water Management Plan". In order to adapt to the effects of climate change Policy PS 6 (Alleviating and adapting to the effects of climate change) requires proposals to take account and respond to: "*Locating away from flood risk areas, and aim to reduce the overall risk of flooding within the Plan area and areas outside it, taking account of a 100 years and 75 years of flood risk in terms of the lifetime of residential and non-residential development, respectively, unless it can be clearly demonstrated that there is no risk or that the risk can be managed" and "Aim for the highest possible standard in terms of water efficiency and implement other measures to withstand drought, maintain the flow of water and maintain or improve the quality of water, including using sustainable drainage systems*".
New Nuclear Build at Wylfa: Supplementary Planning Guidance [RD8]	The purpose of this Supplementary Planning Guidance is to provide advice on important local matters relating to the proposed Wylfa Newydd Project and its Associated Development and to set out the IACC's response to national and local policy and strategies in the context of the Wylfa Newydd Project. The Supplementary Planning Guidance is designed to augment existing national and local planning policy. The Supplementary Planning Guidance highlights some of the readily identifiable potential impacts of the Wylfa Newydd Project and outlines potential mitigation and enhancement measures to ensure that significant adverse effects are avoided or are minimised where possible. It is anticipated that this will be achieved for the water environment by: • conserving the integrity of sites on or near the island designated at a European, national or local level for their nature conservation value; • promoting the sustainable use of resources such as water; • minimising the release of potentially polluting substances to water; • ensuring resilience to climate change; and

Policy	Description
	• reducing the risk of flooding, both on-site and beyond the boundaries of the sites proposed for development. GP21 (Conserving the Water Environment) states that where the potential for adverse impacts are identified, measures should be implemented to mitigate these impacts.

Key guidance

8.2.4 The surface water and groundwater assessment has been undertaken in line with a number of key technical guidance documents. These guidance documents are widely used across the UK and represent standard good practice for the assessment for the various consenting regimes. These are summarised in table B8-3.

Table B8-3 Summary of key guidance

Guidance	Description
UK Technical Advisory Group on the Water Framework Directive: *Paper 11b(i) Groundwater Chemical Classification for the purposes of the Water Framework Directive and the Groundwater Directive* [RD9] and *Paper 11b(ii): Groundwater Quantitative Classification for the purposes of the Water Framework Directive* [RD10].	The UK Technical Advisory Group (UKTAG) is a partnership of the UK environment and conservation agencies, providing a series of documents giving guidance on the WFD and the assessment process. These papers describe: "*the classification process for quantitative and chemical status of groundwater bodies during the 2nd River Basin Management Planning cycle*." Paper 11b(i) details: "*the procedures for translating the definitions of good groundwater chemical status into an operational classification system*." Paper 11b(ii) provides: "*the detailed procedures for the translation of the definitions of good groundwater quantitative status outlined in Annex V of the [WFD] into an operational classification system*."
UK Climate Projections (UKCP) 09 [RD11]	UK Climate Projections is managed by the Environment Agency and the Met Office. UKCP09 provides future climate projections for land and marine regions of the UK for the 21st century based on a variety of information sources. It can be used to help assess climate risks and plan adaptation to climate change.
CL-03-16 Climate change allowances for planning [RD12]	This guidance sets out: "*…how projected increases to peak river flows and sea levels, resulting from climate change, should*

Guidance	Description
	be incorporated into [FCAs], for individual planning applications and for the purpose of development planning, in areas where there is a risk of flooding."
The Environment Agency's approach to groundwater protection [RD13]	These documents were prepared by England's Environment Agency. However, NRW has adopted the Environment Agency's approach to protecting groundwater [RD14]. The groundwater protection documents set out the framework within which NRW works and set out position statements which provide information about NRW's approach to managing and protecting groundwater.
Guidance for Pollution Prevention (GPP) [RD15]	A series of documents has been prepared (with further documents in production) to provide environmental good practice guidance. The documents of relevance issued up to January 2018 include: GPP2 (Above ground oil storage tanks), GPP5 (Works and maintenance in or near water), GPP13 (Vehicle washing and cleaning), GPP19 (Vehicle service and repair), GPP20 (Dewatering underground ducts and chambers), GPP21 (Pollution incident response planning) [RD3].
Water Strategy for Wales [RD16]	The *Water Strategy for Wales* covers all inland waters, estuaries and coastal waters, including groundwater. It sets out the Welsh Government's direction for water policy over the next 20 years and beyond. The strategy highlights the Welsh Government's vision to have a thriving water environment which is sustainably managed to support healthy communities, flourishing businesses and the environment.
Construction Industry Research and Information Association (CIRIA) Guidance	Guidance related to implementing good construction practices and design. The relevant CIRIA publications are outlined below: • *Environmental Handbook for Building and Civil Engineering Projects* (3 Parts) (C512, C528, C529) [RD17, RD18, RD19]; • *Control of water pollution from construction sites. Guidance for consultants and contractors* (C532) [RD20]; • *Environmental good practice on site guide* (fourth edition) (C741) [RD21]; • *Land use management effects on flood flows and sediment – guidance on prediction* (C719D) [RD22]; • *The SuDS Manual* (C753) [RD23];

Guidance	Description
	• *Development and flood risk – guidance for the construction industry* (C624) [RD24]; and • *Culvert Design and Operating Guide* (C689) [RD25].
Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 10: Road Drainage and the Water Environment (HD45/09) [RD26]	Outlines methodologies and criteria for assessing effects on the water environment from road developments, including possible impacts on the quality of water bodies and catchments. The manual includes procedures for assessing impacts, for assessing the level of impacts, identifying appropriate mitigation and reporting.
Interim Advice Note 81/06, Volume 11 Section 2, Part 5, Assessment and Management of Environmental Effects [RD27]	An Interim Advice Note which contains specific guidance for assessing environmental effects in connection with works on motorways and trunk roads.
How to Comply with Your Environmental Permit. Version 8 [RD28]	The document describes the standards and measures that must be used to control the most common risks of pollution from industrial activities and how to comply with the conditions of an Environmental Permit. Of particular relevance here is the guidance in Part 3 regarding emissions to water, control of these, and appropriate monitoring. The document also outlines the requirements for the efficient use of water. The guidance also lists the requirements for secondary containment systems needed to protect the water environment.

8.3 Consultation

8.3.1 This section provides a topic-specific account of scoping, statutory and non-statutory consultation undertaken to support the assessment. For a full overview of the environmental consultation activities undertaken for the Wylfa Newydd Project, refer to chapter A6 (EIA Scoping Report and Addendum) (Application Reference Number: 6.1.6) and chapter A7 (consultation with environmental stakeholders) (Application Reference Number: 6.1.7).

Planning Inspectorate Scoping Opinion

8.3.2 In March 2016, Horizon submitted an updated Wylfa Newydd Project EIA Scoping Report to the Planning Inspectorate. In May 2017, Horizon submitted an Addendum to the March 2016 Wylfa Newydd Project EIA Scoping Report to the Planning Inspectorate. Following a period of consultation with

stakeholders, a further Scoping Opinion was received from the Secretary of State (via the Planning Inspectorate) on 14 June 2017.

8.3.3 The Wylfa Newydd Project EIA Scoping Report, Addendum and the subsequent Scoping Opinions (all of which are available on the Horizon website) inform the approach to the assessment. Table B8-4 provides an account of how comments raised by stakeholders in the Scoping Opinion have been considered in the surface water and groundwater assessment.

Table B8-4 Key issues raised through scoping

Key issue raised	Action taken
"The FCA will need to overlap and cross refer to both the surface water and coastal processes chapter…." "The ES / DCO application should demonstrate, through the submission of an FCA, that the consequences of flooding can be managed over the lifetime of the development. Prior to completing the FCA the applicant is advised to contact NRW for additional advice and information on preparing an FCA which is appropriate to the scale and nature of the development." (NRW)	An FCA is provided as appendix D8-4 (Application Reference Number: 6.4.29) for the WNDA Development, E8-1 (Application Reference Number: 6.5.16) for the Off-Site Power Station Facilities, F8-1 (Application Reference Number: 6.6.16) for the Park and Ride, G8-1 (Application Reference Number: 6.7.20) for the A5025 Off-Line Highway Improvements and H8-1 (Application Reference Number: 6.8.16) for the Logistics Centre and these make reference to both the surface water and groundwater chapters (D8, Application Reference Number: 6.4.8; E8, Application Reference Number: 6.5.8; F8, Application Reference Number 6.6.8; G8, Application Reference Number: 6.7.8; and H8, Application Reference Number: 6.8.8) and the coastal processes and coastal geomorphology chapter (D12, Application Reference Number: 6.4.12) where relevant. Consultation with NRW in relation to the FCAs has been undertaken (see table B8-9).
There is considerable overlap between the topic areas in chapters 14 (surface water and groundwater) and 15 (coastal geomorphology) of the Scoping Report. "The Applicant should carefully consider how to present these overlapping topic	Where there are overlapping topics the potential effects are considered in the relevant chapters with a level of detail commensurate with the issue. The cumulative effects on

Key issue raised	Action taken
areas such that potential effects of the proposed development can be clearly understood….” (Planning Inspectorate)	receptors are then considered in chapter I5 (inter-project cumulative effects) (Application Reference Number: 6.9.5).
“…the Applicant is advised to consult with NRW as to the scope of this [WFD] assessment and its integration within the EIA….” (Planning Inspectorate)	Consultation with NRW on the approach to WFD has been undertaken and it was agreed that a standalone WFD Compliance Assessment (Application Reference Number: 8.26) would be provided. This has been provided with this Environmental Statement as a standalone document (Application Reference Number: 8.26).
“The modelling approach should be agreed with NRW and consider any overlap with the ecological assessments such that it accounts for impacts on designated sites for nature conservation.” (Planning Inspectorate)	The modelling approach has been discussed and agreed with NRW, and the approach at Sites of Scientific Interest (SSSIs) /Special Areas of Conservation (SACs) includes input from ecologists. Separate conceptual models have been included for Tre’r Gof and Cae Gwyn SSSIs (see appendices D8-5 Tre-r Gof Hydroecological Assessment, Application Reference Number: 6.4.30 and D8-6 Cae Gwyn Hydroecological Assessment, Application Reference Number: 6.4.31).
Details are needed on the “…necessary surface and groundwater abstraction and/or discharges that may be required for the proposed development for both construction and operation” and the impacts on existing abstractions need to be determined. (Planning Inspectorate)	Effects of abstraction as part of dewatering for construction are provided in chapter D8 (Application Reference Number: 6.4.8). Effects of increased water resource requirements are addressed by Dŵr Cymru Welsh Water (DCWW) with cumulative effects considered in chapter I5 (Application Reference Number: 6.9.5).
“The ES [Environmental Statement] should detail how sewage will be treated	Consideration of the effects of sewage discharges are provided

Key issue raised	Action taken
and the potential impacts of any discharges on the environment during both construction and operation." (Planning Inspectorate)	in the surface water and groundwater chapters of this Environmental Statement (chapter D8, Application Reference Number: 6.4.8; E8, Application Reference Number: 6.5.8; F8, Application Reference Number: 6.6.8; and H8, Application Reference Number: 6.8.8) and, for the Wylfa Newydd Development Area, the marine environment chapter (chapter D13, Application Reference Number: 6.4.13).
"The Applicant's attention is drawn to Volume 2 of NPS EN-6 (paragraph C.9.52) which states that a detailed assessment of the groundwater connections between Llyn Dinam SAC and the Wylfa [Power Station] site should be considered at the detailed project stage." (Planning Inspectorate, with similar comment raised by IACC)	There is no hydrological or hydrogeological connection between the Wylfa Newydd Development Area and Llyn Dinam SAC due to the topography, geology and distance between the Wylfa Newydd Development Area and the SAC (over 15km). The connection to the Park and Ride facility is considered in chapter F8 (Application Reference Number: 6.6.8).
"When considering aspects of the environment likely to be affected by the proposed development; including flora, fauna, soil, water, air and the inter-relationship between these, consideration should be given to the designated sites in the vicinity of the proposed development." (Planning Inspectorate)	All relevant European Designated Sites, locally designated sites and SSSIs with potential source-effect pathways have been considered in the relevant surface water and groundwater chapters of this Environmental Statement (D8, Application Reference Number: 6.4.8; E8, Application Reference Number: 6.5.8; F8, Application Reference Number: 6.6.8; G8, Application Reference Number: 6.7.8; and H8, Application Reference Number: 6.8.8.
Climate change should be considered including how it is likely to change baseline conditions during the lifetime of the Project. (IACC)	Climate change is considered within each relevant chapter and within baseline appendices D8-1 (Surface Water Baseline

Key issue raised	Action taken
	Report, Application Reference Number: 6.4.26) and D8-3 (Groundwater Baseline Report, Application Reference Number: 6.4.28).
"Consideration should be given……to the status of Cemaes Bay bathing water quality…" (IACC)	Effects from sediment and other water quality parameters including bacteriological parameters on Cemaes Bay is provided in chapter D13 (Application Reference Number: 6.4.13).
"The council would expect to be able to comment on the applicant's methodology for identification of the surface water study area..." and "…the council would wish to see the catchment adjacent to (east of) Cemaes included." (IACC)	The methodology for identification of the study area is provided in appendix D8-1 (Application Reference Number: 6.4.26). The Afon Wygyr has been scoped out of the assessment as detailed in chapter D8 (Application Reference Number: 6.4.8).
"The groundwater study area appears to be logical although its method of identification is unclear and the council recommends that it refer to groundwater flow patterns as evidence for its extent." (IACC)	Groundwater flow patterns are considered in chapter D8 (Application Reference Number: 6.4.8) and appendix D8-3 (Application Reference Number: 6.4.28).
"Sensitive receptors identified for the groundwater assessment should include groundwater water quality whilst in respect of the fluvial geomorphology assessment, it is unclear why the bed and banks of the river systems are the only features being assessed. The council believes that the assessment should include impacts on their floodplains." (IACC)	An assessment of the effects of the development on groundwater quality is provided in chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8). The effects of the WNDA Development on the floodplains are provided in chapter D8 (Application Reference Number: 6.4.8).

Key issue raised	Action taken
“NRW advise that both construction and operational impacts on both Cae Gwyn and Tre’r Gof SSSI are fully assessed in the [Environmental Statement].” (NRW)	Hydroecological assessments for the Tre’r Gof SSSI and Cae Gwyn SSSI are provided in appendices D8-5 (Application Reference Number: 6.4.30) and D8-6 (Application Reference Number: 6.4.31) and the effects on these receptors are considered in chapter D8 (Application Reference Number: 6.4.8) and chapter D9 (terrestrial and freshwater ecology, Application Reference Number: 6.4.9).
“NRW consider that hydrological /hydrogeological data should normally be collected for at least 2 years to overcome seasonal variations.” (NRW)	Where possible, data collected to allow for the assessment of effects to be made do cover a minimum two-year period. Where less data is available the uncertainties associated with this are discussed in chapter D8 (Application Reference Number: 6.4.8) and appendices D8-5 (Application Reference Number: 6.4.30) and D8-6 (Application Reference Number: 6.4.31)
“The [Environmental Statement] should detail appropriate mitigation measures for avoiding and reducing impacts on Tre'r Gof SSSI. Where damage to the SSSI features cannot be avoided, the ES should demonstrate how all alternatives have been fully considered.” and “where damage to the SSSI is considered likely despite full consideration of avoidance and mitigation measures, then the ES should specify possible compensation measures.” (NRW)	Embedded mitigation to reduce the effects of the Wylfa Newydd Power Station on the Tre’r Gof SSSI is provided in chapter D1 (proposed development) (Application Reference Number: 6.4.1). Additional mitigation and assessments of the potential effects on Tre’r Gof SSSI are provided in chapters D8 (Application Reference Number: 6.4.8) and D9 (Application Reference Number: 6.4.9). A compensation strategy has been developed to offset the potential effects to Tre’r Gof SSSI following discussions within the SSSI compensation technical advisory group; see appendices D9-23 (Application Reference Number: 6.4.56) and

Key issue raised	Action taken
	D9-24 (6.4.57). The potential effects of this strategy at the compensation sites are assessed in appendix D1-2 (Application Reference Number: 6.4.18).
"NRW consider that the proposed works, including earthworks and mounding, within the catchment has the potential to have significant effects on Cemlyn Bay SSSI/SAC. The ES should provide sufficient information, including appropriate mitigation where necessary to demonstrate how impacts to the Cemlyn Bay SSSI/SAC will be avoided." (NRW)	Chapter D8 (Application Reference Number: 6.4.8) provides an assessment of the potential effects of the drainage and mounding works on Cemlyn Bay. Further consideration is also provided in chapter D13 (Application Reference Number: 6.4.13) with respect to the marine environment.
"The [landform] re-profiling works will significantly change drainage patterns locally and these will need to be engineered/mitigated to manage risks. These will need to be demonstrated…." (NRW)	Hydrological modelling (see appendix D8-7, Application Reference Number: 6.4.32) and the FCA (appendix D8-4, Application Reference Number: 6.4.29) for the construction and operation phases (and decommissioning where relevant) of the development areas are based on the layout of each site including any landform/ground re-profiling.
Assessments should be carried out on the consequence of blockage/collapse of a culvert at Porth Wylfa beach. (NRW)	This is considered in chapter D8 (Application Reference Number: 6.4.8) and the FCA in appendix D8-4 (Application Reference Number: 6.4.29).
Information should be provided on the Wylfa Newydd Power Station water supply. (NRW)	A water supply assessment has been separately made by DCWW. The pipeline for this is assessed as a cumulative effect in chapter I5 (Application Reference Number: 6.9.5).
Information on sewage discharges should be provided. (NRW)	An assessment of the sewage discharge is provided in chapter D13 (Application Reference Number: 6.4.13) as the discharge is to sea.

Key issue raised	Action taken
"The [Environmental Statement] should include a WFD compliance assessment report and NRW advise the applicant seek further advice from NRW on the preparation and completion of this report." and "The applicant should also be aware that consideration must be given as to whether the proposed works as part of the DCO application could prevent any mitigation measures or actions intended to achieve Good Ecological Status (GES) / Good Ecological Potential (GEP) from being implemented, which could result in the water body failing to meet its objectives. Where a scheme is considered to cause deterioration, or where it could contribute to a failure of the water body to meet GES or GEP, then an Article 4.7 assessment would be required." (NRW)	Consultation with NRW on the approach to WFD has been undertaken. A standalone WFD Compliance Assessment (Application Reference Number: 8.26) is provided. This assesses whether it could prevent any water bodies from reaching GES/GEP. It is recognised that if the objectives were predicted not to be achieved, then an Article 4.7 assessment would be required. This is discussed in the WFD Compliance Assessment (Application Reference Number: 8.26).
"Our recommendation is that the Environmental Impact Assessment provides comprehensive information on the drainage strategy for the development site." (DCWW)	The surface water drainage strategy for construction and operation of the Power Station is provided in chapter D1 (Application Reference Number: 6.4.1) and the drainage scheme is discussed in chapter D8 (Application Reference Number: 6.4.8). Details of the drainage at the Off-Site Power Station Facilities are included in chapter E8 (Application Reference Number: 6.5.8), details of drainage at the Park and Ride are provided in chapter F8 (Application Reference Number: 6.6.8), details of drainage along the A5025 are provided in chapter G8 (Application Reference Number: 6.7.8) and drainage at the Logistics Centre is provided in chapter H8 (Application Reference Number: 6.8.8).
"Horizon Nuclear Power (HNP) should consult NRW on the preparation of their	A draft FCA was provided to NRW for comment in September 2017. These comments and

Key issue raised	Action taken
[FCA] however, to date, NRW has not been consulted on a draft FCA" (NRW)	Horizon's response are provided in table B8-9.
"We advise that the Valley offline section is now classified as being within zone C2" and "We have previously raised concerns regarding the A5025 Valley intersection proposal" and "The FCA should demonstrate how the development complies with TAN15: Development and Flood Risk. Should any aspect of the Associated Developments (e.g. A5025 offline Valley improvement) increase flood risk" (NRW)	The flood zone has been updated, bespoke flood modelling has been completed for the Valley junction and the flood risk and requirement for flood compensation has been taken into account in the road design to meet the requirements of TAN 15. Details are provided in the FCA in appendix G8-1 (Application Reference Number: 6.7.20).
"Project waste water discharges on the main site will need to be fully assessed and information provided within the WFD Compliance Assessment." (NRW)	The WFD Compliance Assessment (Application Reference Number: 8.26) and chapter D8 (Application Reference Number: 6.4.8) contain information detailing how sewage will be dealt with.
"We advise that table 11.2 should clearly make the link to chapter 14 and the WFD water bodies relevant to the Park and Ride and Logistics Centre" and "In relation to the Dalar Hir Park and Ride facility, section 11.2.3 does not refer to the need to consider impacts from this part of the project within the WFD Compliance Assessment" (NRW)	All Associated Development sites include details of the link to the standalone WFD Compliance Assessment (Application Reference Number: 8.26) and the report provides a comprehensive assessment of all relevant aspects of the Wylfa Newydd Project.
"The extent of the study area for the associated development elements is not specified…" and "It would also be helpful to delineate the study area on relevant plans appended to the [Environmental Statement]" (Planning Inspectorate)	Study areas are described in section 8.2 of chapters E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8) and the limit of the study area is shown on figure 8.1 in the figure booklet for volumes D (Application Reference Number: 6.4.101), E (Application Reference Number: 6.5.27), F (Application Reference Number: 6.6.38), G (Application

Key issue raised	Action taken
	Reference Number: 6.7.48) and H (Application Reference Number 6.8.29).
"Consideration should be given to the inclusion of these [aquifers and private supplies] in the topic assessment." (Planning Inspectorate)	These receptors are considered in all water related chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8) in the Environmental Statement.
"The SoS notes that site walkovers will be undertaken for the logistics centre 'if found necessary'. It is not explained how this would be determined" (Planning Inspectorate)	A walkover has been completed and details are provided in chapter H8 (Application Reference Number: 6.8.8).
"Table 14.1 of the Scoping Report identifies a number of nationally and internationally designated sites that it is proposed will be scoped out from the A5025 off-line highway improvements assessment. However, the rationale for doing so has not been provided" (Planning Inspectorate)	Chapter G8 (Application Reference Number: 6.7.8) provides details of any designated sites that have been scoped out and the basis for this (primarily the absence of a pathway from source to receptor).
"The SoS notes that reference is made to the provision of an Environmental Management Plan (EMP) containing mitigation measures relating to potential impacts on surface water and groundwater. The SoS suggests that a draft EMP is included with the DCO application and that cross-reference is made from the ES to the relevant mitigation measures contained with the EMP" (Planning Inspectorate)	For the Wylfa Newydd Project, Horizon will provide a Code of Construction Practice (CoCP) (Application Reference Number: 8.6) and a Code of Operational Practice (CoOP) (Application Reference Number: 8.13) with the Environmental Statement that set out the overarching pollution management principles to be applied across the Wylfa Newydd Project.

Statutory consultation

Pre-Application Consultation Stage One

8.3.4 The aim of Pre-Application Consultation Stage One, undertaken in late 2014, was to share information available at the time with Horizon's key consultees

and stakeholders, in order to consider feedback in ongoing design development. Table B8-5 outlines how key issues raised during Pre-Application Consultation Stage One have been considered in the assessment.

Table B8-5 Key issues raised during Pre-Application Consultation Stage One

Key issue raised	Action taken
Water resources Consideration should be given to water resources and potable water supply for the Wylfa Newydd Project and assess increased abstraction that may result from the development. (NRW)	Water demand has been estimated. Consultation has taken place with DCWW to identify the water supply for the construction and operation phases of the Wylfa Newydd Power Station. The proposed supply is briefly discussed in chapter D8 (Application Reference Number: 6.4.8). At all other sites the water demand is low and can be provided from existing supplies.
Methodology NRW requests the opportunity to comment on assessment and methodology and outputs. (NRW)	Consultation with NRW on a number of aspects has taken place as detailed in table B8-9.
Water quality Ensure discharges of foul sewage do not affect water quality. Need to assess surface water and groundwater quality effects.	Discharges of treated sewage would be to the sea for the Power Station Site. An assessment of the effects of foul sewage from the Wylfa Newydd Development Area during construction and operation is therefore provided in chapter D13 (Application Reference Number: 6.4.13). For the Off-Site Power Station Facilities and Associated Development, sewage discharges are considered in the relevant water chapters (E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), and H8 (Application Reference Number: 6.8.8). Chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8

Key issue raised	Action taken
	(Application Reference Number: 6.8.8) provide an assessment of the effects of the Wylfa Newydd Project on surface water and groundwater quality.
Fluvial geomorphology Consider enhancements to restore the natural fluvial geomorphology.	Any possible enhancements have been considered, and where the works are considered to enhance the water features, this is reported in the effects section of chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8)
SSSIs Need to assess the potential effects on SSSIs including the groundwater dependency of the SSSIs. Appropriate mitigation and, where appropriate, compensation needs to be provided.	Studies have been undertaken to define conceptual models for the Tre'r Gof and Cae Gwyn SSSIs (appendix D8-5, Application Reference Number: 6.4.30 and D8-6, Application Reference Number: 6.4.31). The effects on these SSSIs are considered in chapter D8 (Application Reference Number: 6.4.8). Effects on other SSSIs and European Designated Sites are considered where relevant in chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8).
Monitoring Further sampling should be undertaken to support the Environmental Statement.	Surface water and groundwater monitoring has continued for the Wylfa Newydd Development Area with data up to August 2017 reported in the hydrology and hydrogeology baseline reports (see appendices D8-1 (Application Reference Number: 6.4.26) and D8-3 (Application Reference

Key issue raised	Action taken
	Number: 6.4.28). Surface water and groundwater monitoring continues into 2018 to provide a robust dataset for establishing the baseline conditions.
Flood risk There is a requirement to consider flood risk.	Flood risk is considered, supported by FCAs, for each area of the development with details provided in chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8)

Pre-Application Consultation Stage Two

8.3.5 In September 2016, Horizon shared a Preliminary Environmental Information Report as part of Pre-Application Consultation Stage Two. This presented preliminary details of the predicted environmental effects and mitigation measures for any adverse effects identified. Table B8-6 outlines how key issues raised during Pre-Application Consultation Stage Two have been considered in the assessment.

Table B8-6 Key issues raised during Pre-Application Consultation Stage Two

Key issue raised	Action taken
Baseline information The baseline description does not provide sufficient detail of investigations undertaken or ongoing to support the descriptions and assessments of the baseline conditions and value of receptors. (IACC and NRW)	Baseline information has increased since submission of the Preliminary Environmental Information Report and the extra data is included in appendices D8-1 (Application Reference Number: 6.4.26) and D8-3 (Application Reference Number: 6.4.28).
Further development of detailed conceptual site model (CSM) and source-pathway-receptor paths required to ensure adequate assessment of effects, magnitude and significance. (IACC)	Detailed CSMs for the Tre'r Gof and Cae Gwyn SSSIs are provided in appendices D8-5 (Application Reference Number: 6.4.30) and D8-6 (Application Reference Number: 6.8.31). CSMs for the Associated Development Sites are provided in chapters E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8)
Hydrologically dependent habitat baseline data to inform modelling and analysis should be conducted over a number of years and throughout all seasons and should encompass borehole/piezometer data to establish a full picture of the hydrological zone of influence. (North Wales Wildlife Trust (NWWT))	Details of the surface water and groundwater monitoring undertaken in and around the Wylfa Newydd Development Area are provided in the baseline reports in appendices D8-1 (Application Reference Number: 6.4.26) and D8-3 (Application Reference Number: 6.4.28).
Ecological Compensation Sites There is still considerable concern that mitigation is not sufficiently well developed. Particular concern relates to the lack of apparent progress towards the off-site SSSI	The assessment of off-site Ecological Compensation Sites has progressed, and suitable Ecological Compensation Sites have

Key issue raised	Action taken
compensation given that impacts will occur during construction works. (NWWT)	been identified by Horizon. These are detailed in appendix D9-23 (SSSI Compensation Strategy - Volume I) (Application Reference Number: 6.4.56) and appendix D9-24 (SSSI Compensation Strategy - Volume II) (Application Reference Number: 6.4.57).
Design of the surface water drainage system The application does not demonstrate sufficient drainage management controls and that an adequate discharge quality can be achieved (National Trust).	A revised drainage design strategy is given in chapter D1 (Application Reference Number: 6.4.1) with further details of the drainage design and sediment control measures for the Wylfa Newydd Development Area given in chapter D8 (Application Reference Number: 6.4.8).
There may be effects from residual chemical impacts on water quality as a result of the use of flocculants. It is advised that the impacts of the drainage measures should be fully assessed in the Environmental Statement. (NRW)	Consultation with NRW on the drainage design has taken place. The effects of residual chemicals on the water quality and effects this would have on the receiving water are considered in chapter D8 (Application Reference Number: 6.4.8).
For the A5025, any improvement in discharge quality of road drainage could contribute to a slight improvement of river quality that could help provide a cumulative benefit in relation to WFD water bodies. (NRW)	This is noted and mitigation measures to improve water discharges have been considered where possible. These are outlined in chapter G8 (Application Reference Number: 6.7.8).
Design of the surface water drainage system It is recommended that the layout of the Park and Ride facility incorporates open water attenuation features to mitigate for the loss of wetland habitats. (NWWT)	Wet ditches and streams that are currently present across the Park and Ride facility would be retained and incorporated within a species-rich grass buffer area as detailed in chapter

Key issue raised	Action taken
	F8 (Application Reference Number: 6.6.8).
FCA Any proposed bridges should be designed to safely pass the 1% annual exceedance flood event. Any culverting proposals should be kept to a minimal length and for access purposes only. (NRW)	The drainage design works in relation to the surface water features has considered these points (see the FCAs in appendices D8-4 (Application Reference Number: 6.4.29), E8-1 (Application Reference Number: 6.5.16), F8-1 (Application Reference Number: 6.6.16), G8-1 (Application Reference Number: 6.7.20) and H8-1 (Application Reference Number: 6.8.16).
Within the Preliminary FCA, the A5025 Off-line Highway Improvements do raise concerns and will require detailed hydraulic modelling work to assess the flood risk to the proposals especially at Valley and Llanfachraeth. (NRW)	FCAs and modelling for the A5025 Off-line Highway Improvements have been undertaken and are discussed in chapter G8 (Application Reference Number: 6.7.8) and appendix G8-1 (Application Reference Number: 6.7.20).
The construction of the proposed breakwater may permanently change the tidal flow in North Anglesey and generate a greater risk of flooding in Cemlyn Lagoon, potentially leading to a loss of the existing Sandwich tern breeding areas. (NWWT)	The effects of the breakwater have been considered in the FCA report (appendix D8-4, Application Reference Number: 6.4.29) when considering coastal flooding.
Fluvial geomorphology and WFD All infrastructure within the riparian zone of the adjacent watercourses should be removed following the construction period. If infrastructure is to remain this will make WFD targets harder to attain. Information should be provided regarding any enhancements to the natural fluvial geomorphology. (NRW)	An assessment of the effects of the Wylfa Newydd Project on rivers' geomorphology and potential effects on floodplains are included in chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference

Key issue raised	Action taken
Whilst buffer zones are generally provided for water quality the report doesn't directly state to protect the riparian zone of the watercourses. (NRW)	Number: 6.7.8) and H8 (Application Reference Number: 6.8.8). This has now been considered in the assessment of effects for the WNDA Development in chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8) and G8 (Application Reference Number: 6.7.8).
Groundwater modelling It is essential that the modelling study contains sufficient detail to ensure appropriate assessment of identified receptors including Cemlyn Bay SAC. (IACC and NRW)	Detailed modelling has been undertaken. Results have been considered in chapter D8 (Application Reference Number: 6.4.8) and the outputs from the model are included in appendix D8-7 (Surface Water and Groundwater Modelling Results, Application Reference Number: 6.4.32).
Supporting documents NRW recommends that substantive drafts of the Construction Environmental Management Plan (CEMP) and Environmental Management Plan (EMP) are submitted in support of the application for the Development Consent Order. (NRW) Drainage commissioning requirements should not be left to contractor provisions. Tender specification documents should include Horizon specific requirements that have been agreed with relevant permitting body. (NWWT)	A Wylfa Newydd CoCP (Application Reference Number: 8.6) is submitted with this Environmental Statement. This document provides a management strategy for the construction contractors to follow. A Wylfa Newydd CoOP (Application Reference Number: 8.13) has been produced for site operation which sets out the management strategy for the site operator. The drainage design for the Wylfa Newydd Development Area has been produced as

Key issue raised	Action taken
	detailed in chapter D8 (Application Reference Number: 6.4.8). The monitoring requirements would be set in Environmental Permits issued for the Wylfa Newydd Project.
Water supply and foul sewage Water supply is dealt with very superficially. The water demand from the construction activities and workforce as well as the operation of the Power Station will increase pressure on water resources availability in this resource zone. (NWWT, NRW, North Wales Regional Leadership Board, Welsh Local Government Association, and Public Health Wales) NRW's expectation is that before any foul drainage systems are proposed, HNP will consider the proximity of a main sewer before applying for a permit for water discharge activity. NRW is likely to refuse an Environmental Permit application where its permitting function considers it is feasible to connect to the main sewer. (NRW, North Wales Regional Leadership Board, Welsh Local Government Association, and Public Health Wales)	Further assessment of the water supply source and effects has been undertaken by DCWW. The effect of the new pipe that has to be laid to the Power Station for the additional supply is considered in chapter I5 (Application Reference Number: 6.9.5) of this Environmental Statement. Foul sewage connections to the main sewer have been considered for all development areas and discussed with DCWW. Only where it has not been reasonably practicable to connect to the main sewer has an alternative been proposed as set out in chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8)
WFD NRW has not received a Preliminary WFD assessment or a detailed WFD compliance assessment report. In view of HNP's proposed timescale NRW recommend that	Consultation with NRW in relation to the WFD Compliance Assessment (Application Reference Number: 8.26) has

Key issue raised	Action taken
HNP consult NRW as soon as possible. (NRW)	subsequently been undertaken. A Preliminary WFD compliance assessment was issued to NRW for which comments were received. A WFD Compliance Assessment (Application Reference Number: 8.26) is provided as a supporting report.

Pre-Application Consultation Stage Three

8.3.6 Table B8-7 outlines how key issues raised during Pre-Application Consultation Stage Three have been considered in the assessment.

Table B8-7 Key issues raised during Pre-Application Consultation Stage Three

Key issue raised	Action taken
Tre'r Gof SSSI Impacts to Tre'r Gof SSSI hydrology should be considered permanent. (NWWT)	Impacts to Tre'r Gof SSSI are considered in section 8.5 of chapter D8 (Application Reference Number: 6.4.8). Effects during operation are considered as permanent.
With regards to Tre'r Gof SSSI, there is a disconnect between the assessment of effects in the 'groundwater and surface water' sections and the ecology section. (IACC)	The ecology and surface water sections of the Environmental Statement assess the potential effects on Tre'r Gof SSSI from a different perspective and so it is not unexpected that the results differ. The water chapter assesses the effects on the water environment (water quality, resources, flood risk, fluvial geomorphology, groundwater interactions etc) whilst the ecology chapter assesses the effects that changes (including those to the water environment) could have on the ecological receptors.
No details are provided on the proposed drainage regime, on the existing ground and surface water	The proposed drainage regime associated with the landscape mounds around the Tre'r Gof SSSI

Key issue raised	Action taken
flows to Tre'r Gof SSSI and how they might be compromised. (IACC) The consultation document states that buffer zones will be provided between sensitive receptors such as Tre'r Gof and construction works. With the buildings 65 m from Tre'r Gof, the construction zone will occupy much of the intervening space, so buffers to the north of the SSSI may not be effective. The buildings and therefore their foundations would cross the slope and are likely to change the hydrological/ hydrogeological conditions in the adjacent part of the site. (NRW)	is detailed in appendix D8-8 (summary of preliminary design for construction surface water drainage) (Application Reference Number: 6.4.33). The drainage associated with the Site Campus is discussed in section 8.4 of chapter D8 (Application Reference Number: 6.4.8). The potential effects of these on the water environment at the Tre'r Gof SSSI are discussed in section 8.5 of chapter D8 (Application Reference Number: 6.4.8), whilst embedded and good practice mitigation is discussed in section 8.4 with additional mitigation discussed in section 8.6 of chapter D8 (Application Reference Number: 6.4.8). The potential changes to the hydrology and hydrogeology to the north of the Tre'r Gof SSSI have been assessed and the potential for these to affect the SSSI are detailed in section 8.5 of chapter D8 (Application Reference Number: 6.4.8) of the Environmental Statement. These potential effects take into account the presence of the proposed buffer zones.
Drainage The drainage strategy is unacceptable as the SSSI should not receive surface water run-off from the development and there appears to be no consideration of attenuation within the Site Campus. (NWWT) Incorporate appropriate mechanisms on the eastern freshwater inflow	The drainage strategy has been updated and is provided in appendix D8-8 (Application Reference Number: 6.4.33). The Site Campus scheme includes attenuation of runoff to greenfield runoff rates and this is included in sections 8.4 and 8.5 of chapter D8 (Application Reference Number: 6.4.8) of the Environmental Statement.

Key issue raised	Action taken
adjacent to the remodelled landform. (RSPB)	Natural Sustainable Drainage Systems (SuDS) type attenuation ponds and flow control structures have been incorporated into the drainage design. This is detailed in appendix D8-8 (Application Reference Number: 6.4.33).
Decommissioning The stated decommissioning strategy of returning to 'pre-developed condition', provides no recognition that changes to superficial groundwater and surface water flows, which maintain Tre'r Gof SSSI, will represent permanent and long-term impacts respectively. (NWWT) Concerns are still unresolved in SPC in relation to the mechanism for reinstatement following topsoil stripping should Wylfa Newydd not be implemented. (NWWT)	The new landscape mounds and revised drainage will remain in place. Only the area for the Site Campus will be returned to its pre-developed condition. Details are provided in sections 8.4 and 8.5 of chapter D8 (Application Reference Number: 6.4.8). The potential effects are considered in section 13.6 of chapter 13 of the SPC Environmental Statement (surface water and groundwater).
Water supply The consultation document does not provide any estimated quantity of water demand for the construction and operation of the nuclear power station. (NRW) HNP will need to quantify the water supply needed and discuss with Dwr Cymru/Welsh Water (DCWW) to ensure that sufficient potable water is available. The impacts of any new options for DCWW to abstract water to meet the Wylfa Newydd demand will need to be fully assessed and information provided within the ES. (NRW) The EIA should provide comprehensive information on the water supply and drainage strategies	An estimate of the water demand for the Power Station is included in section 8.4 of chapter D8 (Application Reference Number: 6.4.8). The requirements for potable water have been discussed with DCWW and DCWW has indicated that the required supplies can be met from existing sources such that a new licensed supply is not required. DCWW is including this in its assessment as part of their next management cycle. The new supply is therefore excluded from the Environmental Statement as agreed with NRW during a meeting held on 19 May 2017. There is no single strategy for water supply and drainage, but there is an approach proposed for each site for

Key issue raised	Action taken
to serve all development sites. (DCWW)	foul and storm water discharge and potable supply. This is detailed in section 8.4 of chapter D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), and H8 (Application Reference Number: 6.8.8).
Water quality Can further information be provided on construction methods, drainage requirements (incl. foul drainage at Site Campus), pollution prevention measures and mitigation. (NRW)	Information regarding pollution prevention measures and mitigation so far as effects on the water environment are concerned are provided in section 8.4 of chapter D8 (Application Reference Number: 6.4.8).
The impacts of soil disturbance and release of both nutrients and silt and operation leading to modified nutrient inputs must be considered. (NRW)	Impacts on water quality are considered in section 8.5 of chapter D8 (Application Reference Number: 6.4.8) of the Environmental Statement, including silt and nutrients.
The locations of the soil storage mounds and the design of drainage systems/sediment traps will be critically important in minimising losses of fine sediment and nutrients in surface runoff to adjoining coastal waters and land areas. The information provided on the LEMP is indicative and very general. (NT)	Details of the drainage system and landscape mounds have been developed through the consultation period and the design principles are provided on the Landscape and Habitat Management Strategy. The drainage strategy is provided in appendix D8-8 (Application Reference Number: 6.4.33) including information regarding the outline design of sediment treatment facilities. The potential effects of this on the environment are discussed in chapter D8 (Application Reference Number: 6.4.8).
Will runoff be directed through sedimentation traps? (NWWT)	A comprehensive range of management activities are proposed to manage suspended sediment. The management details are provided in section 8.4

Key issue raised	Action taken
Very sceptical that provisions to safeguard two of these areas (Tre'r Gof, Cemlyn and Wylfa Head) from sediment-carrying water from the overburden tips will be effective. Accept that ecological clerks of works may well identify problems arising as work progresses, robust prevention would be much more preferable. Will runoff be directed through sedimentation traps? (NWWT)	of chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8). For the Wylfa Newydd Development Area further information is provided in the drainage strategy included in appendix D8-8 (Application Reference Number: 6.4.33).
The Woodland Trust is concerned about changes to the hydrology altering ground water and surface water quantities. Also, the introduction of water run offs from development will result in changes to the characteristics and quality of the surface water as a result of pollution/contamination etc. (WT)	The potential effects on the surface water and groundwater regimes in terms of water quantity and quality are detailed in section 8.5 of chapter D8 (Application Reference Number: 6.4.8). Management systems are included in the designs to reduce the potential for significant effects on water quality and availability.
Foul drainage There is insufficient clarity on the how foul drainage during the main construction phase, as well as the Anaerobic Digestion (AD) sites, is to be dealt with. In line with Planning Policy Wales HNP will apply to the sewerage undertaker to connect to the main sewer before applying to NRW for an EP for water discharge activity to watercourse or ground. (NRW)	Foul drainage is discussed in each of the surface water/groundwater chapters of the Environmental Statement. Details are provided in section 8.4 of chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8). Where practicable connection to a main sewer has been proposed.
No information is given regarding layout of water mains, sewers, drain networks, powerlines and other services which could impact on the SSSI. (NRW)	The location of water mains, sewers, drain networks is part of detailed design and so that information is not currently available, but their generic effects

Key issue raised	Action taken
	have been considered (where relevant) in section 8.4 of chapter D8 (Application Reference Number: 6.4.8) and appendix D8-4 (Application Reference Number: 6.4.29). None of these would be laid in/through the SSSI.
Project waste water discharges on the main site and AD sites will need to be fully assessed and information provided within the ES. (NRW)	Waste water discharges have been considered for all elements of the project. Information is included in sections 8.4 and 8.5 of chapter D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), and H8 (Application Reference Number: 6.8.8).
Increased discharge of treated effluents from the sewage outfalls and the changes to sediment loads from the breakwater construction needs to be included. (NWWT)	The increase in surface water runoff and the management of increased sediment loads is discussed in section 8.4 and the potential effects discussed in section 8.5 of chapter D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8).
WFD NRW advised that HNP should consult NRW on the preparation of their WFD compliance assessment. (NRW) Apparent complete omission of any reference to the WFD. (NWWT) Tre'r Gof SSSI is also a Groundwater Dependent Terrestrial Ecosystem (GWDTE) under WFD. The possible damage to the GWDTE may also be considered to be deterioration in waterbody status under WFD. (NRW)	A standalone WFD Compliance Assessment report (Application Reference Number: 8.26) has been prepared and NRW has been consulted.

Key issue raised	Action taken
Cae Gwyn SSSI NRW request further details with regard to the proposed car park and visitor centre in the vicinity of Cae Gwyn in order to advise on potential impacts and any mitigation that would be required. (NRW)	The car park to the east of Cae Gwyn is proposed as a temporary car park for construction workers. In the event that a visitor centre is constructed it would be further to the east and would not affect Cae Gwyn. The potential effect of the temporary construction workers' car park on Cae Gwyn is considered in section 8.4 of chapter D8 (Application Reference Number: 6.4.8) based on our understanding of how Cae Gwyn functions which is detailed in appendix D8-6 (Application Reference Number: 6.4.31).
Construction practice The CEMP will need to address all the impacts based on the latest proposals. (NRW)	A Code of Construction Practice has been prepared and submitted with the Environmental Statement.
Site Campus Concerned at the immediately local effects of 4000 workers being encamped between Tre'r Gof and Wylfa Head. This is a question of hydrological management but also of collateral damage to these sensitive areas. (NWWT) The potential effects of construction and operation of the Site Campus on groundwater need full consideration. (NRW) Construction of large buildings close to the SSSI has the potential to impact on water quality and water flow down slope into the site. During construction and decommissioning of the Site Campus, HNP will also need to avoid damage to the culvert which carries the outflow from Tre'r Gof and is critical to the functioning of the SSSI. (NRW) The 900-space car park to service the Site Campus could have implications for drainage into Tre'r Gof and should	The effects of construction, operation and decommissioning the Site Campus on the water environment are detailed in section 8.5 of chapter D8 (Application Reference Number: 6.4.8). Mitigation is considered in terms of that embedded in the design and good practice that would be employed during construction, both of which are detailed in section 8.4 of chapter D8 (Application Reference Number: 6.4.8). Additional mitigation required to reduce effects (e.g. associated with drainage management) are detailed in section 8.6 of chapter D8 (Application Reference Number: 6.4.8). The need to avoid damage to the SSSI outfall culvert is recognised and would be communicated to contractors involved in works in the vicinity of the outfall.

Key issue raised	Action taken
be assessed for its hydrological (water quantity and quality) impact. (NRW) There is a need to replicate flow patterns as well as volumes into Tre'r Gof SSSI. The Environmental Statement will need to fully consider the impacts of the project on the SSSI and identify any mitigation that is required. (NRW) There are no details as to whether the foundations and drainage works will be removed during decommissioning of the Site Campus. (NRW) There is no information on how large the construction zone, beyond the buildings, will be. (NRW)	Details of the proposed drainage mitigation, including use of an attenuation tank, are outlined in section 8.4 of chapter D8 (Application Reference Number: 6.4.8). The need to replicate flow patterns as well as volumes is understood and the assessment of effects is based on our understanding of the hydrology of the Tre'r Gof SSSI which is detailed in appendix D8-5 (Application Reference Number: 6.4.30). The Site Campus would be decommissioned and the land returned to its pre-developed condition. The potential extent of the development, including construction activities is outlined in chapter D1 (Application Reference Number: 6.4.1) and is shown on the Site Campus masterplan that is included with that chapter.
Site Campus Construction indicates different level of effect in 'Groundwater and surface water', compared to 'Terrestrial and freshwater ecology'. NRW advise consistency between the topic chapters. (NRW) There is very limited information on the consequences of the drainage	The ecology chapter (D9, Application Reference Number: 6.4.9) and the surface water and groundwater chapter (Application Reference Number: 6.4.8) assess the potential effects on Tre'r Gof SSSI from a different perspective and so it is not unexpected that the results differ. The water chapter (D8, Application Reference Number: 6.4.13) assesses the effects on the water environment (water quality, resources, flood risk, fluvial geomorphology, groundwater interactions etc) whilst the ecology chapter assesses the effects that changes (including those to the water environment) could have on the ecological receptors.

Key issue raised	Action taken
from the site campus (section 5.7.9-10), this approach is surprising given the international significance of the receiving environment. (NT)	The potential effects of the Site Campus on water quality, flow routing, water availability, flood risk and groundwater with regard to the Tre'r Gof SSSI are detailed in section 8.5 of chapter D8 (Application Reference Number: 6.4.8). This approach to foul drainage is outlined in section 8.4 of chapter D8 (Application Reference Number: 6.4.8). As the receiving environment is a UK designated feature it only has national significance – it is not a Natura 2000 site and is therefore not of international significance.
Cemlyn Bay SAC The presence of Wylfa Newydd remodelled landforms within less than 150 m of the SAC boundary on one of the principal freshwater inflows to the lagoon is being assessed and will require both a clear monitoring procedure of outflows and remediation strategy to ensure that emergency action can be initiated should there be, for example, flash flooding and increased sediment loads from storm events, nutrient release and heavy metals/contaminants. (RSPB)	The outline drainage design includes SuDS, attenuation, flow control, passive treatment and active treatment. The scheme has been designed to be as flexible as practicable to allow it to be adjusted during changing conditions such that there is no effect on Cemlyn Bay SSSI, SAC, SPA. The details are provided in chapter D8 (Application Reference Number: 6.4.8) and appendix D8-8 (Application Reference Number: 6.4.33).
Flood risk NRW has not been consulted on a draft [FCA] for any aspect of the Wylfa Newydd Project. (NRW) MEEG/AECC: We advise that reference is made to our maps showing risk of flooding from surface water. Detailed discussions regarding existing surface water drainage arrangements and ordinary watercourses need to be undertaken with the IACC (acting as the Lead Local Flood Authority) regarding this site. (NRW)	Horizon provided Natural Resource Wales with a draft FCA for the Logistics Centre on 10 July 2017 as this was the first FCA prepared for the Wylfa Newydd development. The risks from flooding have been assessed in appendix E8-1 (Application Reference Number: 6.5.16). Specific reference has been made to NRW flood risk maps and additional bespoke flood risk modelling has been completed for the site and appropriate mitigation included in the design (as outlined in section 8.4 of chapter E8,

Key issue raised	Action taken
	Application Reference Number: 6.5.8).
Concerns regarding section 1 of the A5025 Off-line highway improvements being within both NRW's tidal and fluvial flood zones (NRW)	The section of the A5025 at Valley has been re-aligned as far as is practicable, but part of the road remains in the flood plain. Bespoke modelling has therefore been used to design compensation storage. This has been assessed in a flood consequences assessment included in appendix G8-1 (Application Reference Number: 6.7.20). The assessment includes consideration of tidal effects.
There is a strong probability that the proposed A5025 road design and layout at Llanfachraeth will create a flood risk for the property. (Private individual)	Flood risks have been assessed in a FCA which is included in appendix G8-1 (Application Reference Number: 6.7.20). Specific attention has been paid to changes to flood risk caused by the A5025 Off-line Highways Improvements and in particular properties along the route including those in Llanfachraeth.
The same flood risk approach should be taken with regards to the proposed Site Campus as is taken for the main site, as outlined by HNP in the 'DCO Technical Modelling Meeting' with NRW on 12/04/2017. (NRW)	The potential effects of the Site Campus on flood risk have been assessed in section 11 of the flood consequences assessment (appendix D8-4, Application Reference Number: 6.4.29). This follows the approach adopted for the Power Station Site.
Dewatering Changes have been made to the reactor basement dimensions, the construction of which could have implications for groundwater flows and quality. Any such changes will need to be fully assessed in the Environmental Statement (NRW)	The effect of the latest basement dimensions on the water environment is considered in section 8.5 of chapter D8 (Application Reference Number: 6.4.8) supported by groundwater modelling which is included in appendix D8-7 (Application Reference Number: 6.4.32).
There is a risk of saline intrusion from dewatering which could cause deterioration of the Ynys Mon	The potential for, and effects of, saline intrusion are considered in section 8.5 of chapter D8

Key issue raised	Action taken
Secondary Groundwater Body. Damage to a Groundwater dependent terrestrial ecosystem (GWDTE) would also be considered a significant effect. (NRW)	(Application Reference Number: 6.4.8), supported by groundwater modelling of the dewatering activities which is detailed in appendix D8-7 (Application Reference Number: 6.4.32). Potential effects to GWDTEs are also considered in section 8.5 of chapter D8 (Application Reference Number: 6.4.8). The implications of this for WFD are detailed in a standalone WFD Compliance Assessment report (Application Reference Number: 8.26).
NRW consider dewatering for construction over a period of years to be 'long term'. We disagree with the conclusion in A.6.11 that the change from long-term dewatering to no dewatering means that, further to the adverse effects identified in Pre-Application Consultation Stage Two, *"the impact on SSSI during construction is now considered to be negligible"*. It is our understanding that dewatering is still likely to be over a period of years and the potential effects from this is potentially significant. The impacts of dewatering during construction will need to be fully assessed in the Environmental Statement and Habitats Regulations Assessment (HRA)/WFD assessments. The impacts of dewatering during construction will need to be fully assessed in the ES with respect to Tre'r Gof and Cae Gwyn SSSIs. (NRW)	We have defined the terms "long term", "medium term" and "short term" in section 8.4 of this chapter to avoid mis-interpretation. Our assessment, which is detailed in section 8.5 of chapter D8 (Application Reference Number: 6.4.8), uses this defined terminology. The assessment of the effect of dewatering on the SSSI is detailed in section 8.5 of chapter D8 (Application Reference Number: 6.4.8) and is based on our understanding of the functioning of the Tre'r Gof SSSI and groundwater modelling of the potential effects. The only HRA receptor susceptible to dewatering would be Cemlyn Bay and the risk of this is considered to be low. The SSSI is more susceptible but is addressed in the EIA, not the HRA. All potential effects on GWDTE are included in the WFD Compliance Assessment (Application Reference Number: 8.26) which is a standalone document submitted with the Environmental Statement.
Private water supplies	Private water supplies in the study area have been identified and

Key issue raised	Action taken
NRW advise that impacts on private water supplies are fully assessed in the ES. (NRW)	these are detailed in section 8.3 and the potential effects of the development on these are assessed in section 8.5 of chapter D8 (Application Reference Number: 6.4.8).
Off-Site Power Station Facilities The Terrestrial and Freshwater Ecology section (section 9.5 of chapter D9) on change of environmental effect mentions additional hardstanding and *"*the opportunity to retain ditches and water courses may reduce.*"* Although potential effects are not anticipated to be significant, this pathway for impact is not mentioned at all as a potential effect in table 3-4 on Groundwater and Surface water section of table 3-4. (NRW)	There are no open watercourses within the Off-Site Power Station Facilities site. The potential effects on watercourses adjacent to the Off-Site Power Station Facilities (Hen-shop Drain and East Drain) are considered in section 8.5 of chapter E8 (Application Reference Number: 6.5.8).
Fluvial geomorphology Protection of fluvial geomorphological interest of watercourses affected by the Wylfa Newydd project. NRW advise that further information is provided with regard to possible enhancements to restore the natural fluvial geomorphology of rivers that will be affected by the Wylfa Newydd Project. (NRW)	Fluvial geomorphology receptors are identified in section 8.3 of chapter D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8). For the Wylfa Newydd Development Area additional information is provided in a baseline report (appendix D8-2, Application Reference Number: 6.4.27). The potential effects of the development on fluvial geomorphology receptors are considered in section 8.5 of chapter D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8) with mitigation detailed in sections 8.4 and 8.6 of each chapter. The only significant enhancement identified

Key issue raised	Action taken
	is associated with realignment of the Nant Caerdegog Isaf (section 8.4 and 8.5 of chapter D8, Application Reference Number: 6.4.8), with more detail in chapter 13 of the Site Preparation and Clearance Town and Country Planning Act 1990 submission.

Consultation on Additional Land

8.3.7 In February 2018, Horizon undertook consultation on additional land that had not been consulted on previously. The additional land was required to:

- accommodate proposals to create or enhance wetland sites across Anglesey as Ecological Compensation Sites;
- create two new ecological mitigation areas, and minor changes to the connection to the national grid at the Wylfa Newydd Development Area; and
- update the order limits for the A5025 Off-Line Highway Improvements, and minor refinements to the boundaries of the Off-Site Power Station Facilities and Logistics Centre.

8.3.8 The feedback from the consultation has been reviewed and the following key issues were noted in feedback from the IACC, NRW and NWWT with respect to the Ecological Compensation Sites:

- It was acknowledged that the proposed sites have good connectivity with high value designated habitats; however, the information provided within the consultation Preliminary Environmental Information was lacking detail on the hydrological and hydrogeological regimes.
- More information is required on the proposed drainage modifications including the measures for adaptive management.
- It was noted that drainage modifications and ongoing adaptive management have the potential to affect the hydrology/hydrogeology of adjacent SSSI/SAC/Ramsar sites; in particular, there is a potential direct impact on the Anglesey Fens SAC through increased seepage south-west (i.e. diversion of water) from the SAC into any topsoil stripped areas at Cors Gwawr.
- Importance of controlling particulate in-wash to ditches, in particular the main ditch at Cors Gwawr which runs north-east through Cors Bodeilio National Nature Reserve.
- Depending on the extent of earthworks, there are potential risks (probably short term) to flow and quality of wells within or adjacent to the sites. Further investigation is recommended to understand how the wells are used (if at all) and to assess the short term risks to these potential

supplies. Where groundwater supply has been identified for either potable or agricultural use, contingency plans should be drawn up to enable an appropriate response to be made for any unforeseen events of pollution or loss of the ground water supplies concerned.

- There is a main river that crosses all three of the SSSI compensation sites (Ty Du, Cors Gwawr and Cae Canol-dydd) and works may therefore be subject to the requirements of a Flood Risk Activity Permit under the Environmental Permitting Regulations.
- Importance of a robust long-term monitoring programme (hydrological, chemical and vegetation), particularly to inform the proposed adaptive management approach.

8.3.9 Appendix D1-2 (Ecological Compensation Sites: Assessment of Environmental Effects) (Application Reference Number: 6.4.18) provides more detailed information on all the above, the assessment of potential effects relating to these issues, and proposed mitigation where required. Annex 2 to this Appendix provides a Flood Consequences Assessment.

8.3.10 The Tre'r Gof SSSI compensation proposals are contained within Environmental Statement Appendices D9-23 (Volume I) and D9-24 (Volume II) (Application Document Reference: 6.4.9). Volume II comprises outline habitat creation, enhancement and management proposals for the three proposed compensation sites and includes information on proposed drainage works. Further detailed design of the schemes, including drainage alteration proposals will be secured by DCO Requirement in compliance with principles set out in the Landscape and Habitat Management Strategy (Application Document Reference: 8.16).

8.3.11 Mitigation for potential effects associated with surface waters, including hydrological buffer zones where necessary, and ground waters will be secured in the DCO via the Main Power Station Site sub-CoCP (Application Document Reference: 8.7) and via detailed design development in consultation with the Tre'r Gof SSSI Compensation Technical Advisory Group. This will include an 'adaptive management' approach which will allow for alterations to the schemes where monitoring determines that the works are not meeting their objectives or identifies potential adverse effects on sensitive receptors.

8.3.12 The Water Framework Directive Compliance Assessment (Application Document Reference: 8.26) includes assessment of the ecological compensation proposals. While it does not form part of the current consultation, justification for Horizon's temporary worker accommodation proposals are provided in Volume 4 of the Site Selection Report (Application Document Reference: 8.24.4). Further information on the use of all reasonably practicable mitigation measures and consideration of alternative layouts is provided in the Water Framework Directive Compliance Assessment (Application Document Reference: 8.26).

Non-statutory consultation

EIA Progress Report

8.3.13 An EIA Progress Report was provided to the IACC and NRW in 2016 with updated information on the design development and associated environmental assessment. Table B8-8 outlines how key issues raised in feedback from these stakeholders have been considered in the assessment.

Table B8-8 Key issues raised in response to the EIA Progress Report

Key issue raised	Action taken
Fluvial geomorphology and surface water drainage Grid references and photos of the upstream and downstream points would be helpful to inform NRW's advice.	Information has been added to appendix D8-2 (Application Reference Number: 6.4.27).
Information should be provided on the design of light vehicle crossings. Clear span bridges should be used as a first option. Any culverts required would need to be correctly sized and located. (NRW)	Details of watercourse crossings are provided in chapters D8 (Application Reference Number: 6.4.8), F8 (Application Reference Number: 6.6.8), and G8 (Application Reference Number: 6.7.8).
Active water management should be discouraged. Dewatering details - where is it going, how does it compare to natural (temperature/pH/oxygen etc). (NRW)	Active water management is an essential part of the construction drainage due to the need to meet quality criteria as detailed in chapter D8 (Application Reference Number: 6.4.8).
FCAs Climate change guidance recommended by NRW should be used. (NRW)	Text has been added to the FCAs, appendices D8-4 (Application Reference Number: 6.4.29), E8-1 (Application Reference Number: 6.5.16), F8-1 (Application Reference Number: 6.6.16), G8-1 (Application Reference Number: 6.7.20) and H8-1 (Application Reference Number:6.8.16).
Baseline reports Continuing with the flow monitoring for as long as possible, at all the points of interest,	Monitoring has been ongoing and is detailed in appendix

Key issue raised	Action taken
will help to capture the full range of flows. Using this data will increase confidence in the baseline. (NRW)	D8-1 (Application Reference Number: 6.4.26).
Surface water modelling We request clarification on some points with regard to the modelling that has been undertaken. (NRW)	Clarification is provided in chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), and G8 (Application Reference Number: 6.7.8), and associated appendices.
Water quality The principal impacts from a water quality perspective appear to relate to the risk of spillages and sediment. As the water quality impacts are to be covered by the development's EMP, in particular the drainage strategy, then NRW defers any more detailed comments, pending the creation of that document. We note that tunnelling and open cut are different options for construction of the cooling water channels. NRW can provide further advice once in receipt of further information on the associated impacts of each option. (NRW)	An outline Wylfa Newydd CoCP (Application Reference Number: 8.6) is included in this Environmental Statement.
WFD NRW advise HNP seek further advice from NRW with regard to the duration of effects related to construction (8–10 years).	Liaison has been undertaken with NRW (table B8-9) and detail added to the WFD Compliance Assessment (Application Reference Number: 8.26).
Cemaes catchment is classed as low value and having low sensitivity. Please clarify what this is based on.	Detail has been added to the WFD Compliance Assessment (Application Reference Number: 8.26).
In relation to dewatering activities, to enable a full assessment of potential impact, consideration needs to be given to the receiving environment. (NRW)	Information is included in chapter D13 (Application Reference Number: 6.4.13) to

Key issue raised	Action taken
	allow the environmental effects to be assessed.
Water supply The water demand will increase pressure on water resources availability in this resource zone which will fall into deficit from 2024/25 even without taking into account the water demand from the Wylfa Newydd Project. (NRW) NRW advise that HNP/DCWW should seek advice from NRW as early as possible with regard to assessment of impacts on any protected sites potentially affected. (NRW)	Liaison has been completed between Horizon and DCWW and NRW (table B8-9) and DCWW has confirmed that there are adequate supplies available and this will be addressed in their next water management plan.
Baseline reports With regard to surface water flow and quality monitoring NRW has previously advised that two years of data is normally required. (NRW)	Discussions regarding data availability, water balances and CSMs for the Tre'r Gof and Cae Gwyn SSSIs have been completed (table B8-9).
Protected Sites There is potential for impacts to Tre'r Gof SSSI from tunnelling/trenching for the cooling water system tunnels, particularly as a result of dewatering. (NRW) The Preliminary Environmental Information Report states that 'residual effects' on the Tre'r Gof SSSI drains would not be significant. NRW require further information to understand the proposed drainage layout. (NRW) NRW considers that the proposed works have the potential to impact on the Tre'r Gof SSSI, and should therefore be classed as 'high'. No reference to possible compensation requirements is made in the Preliminary Environmental Information Report. (NRW) It should be ensured that existing widespread flows into the Tre'r Goff SSSI	The effect of tunnelling is included in chapter D8 (Application Reference Number: 6.4.8). Detail is provided in chapter D8 (Application Reference Number: 6.4.8). Potential effects of construction dewatering are considered in chapter B8. Precautionary compensation is discussed in chapter D9 (Application Reference Number: 6.4.9). This is noted and included in chapter D8 (Application Reference Number: 6.4.8).

Key issue raised	Action taken
are not converted to a single point source. The mitigation measures should take this into account. (NRW)	

Draft Environmental Statement

8.3.14 During September 2017 draft Environmental Statement chapters were provided to statutory and key non-statutory stakeholders. Table B8-9 outlines key issues raised and how these have been addressed within the Environmental Statement.

Table B8-9 Key issues raised in response to the Draft Environmental Statement

Key issue raised	Action taken
Environment Statement chapter D8 (Application Reference Number: 6.4.8)	
Clarifications required for the methods and criteria used to assess stream flows. (NRW/D8/3 to NRW/D8/7)	Responses to these queries have been provided to NRW. No changes have been made to chapter D8 (Application Reference Number: 6.4.8).
Changes in flow duration curves and how these are presented would help make them easier to interpret. (NRW/D8/8)	The text in chapter D8 (Application Reference Number: 6.4.8) has been updated to take account of the comments.
NRW has a number of concerns regarding some of the terminology used, data interpretation, conceptual models and consistency. (NRW/D8/12,13,15-22,24, 44, 45)	These comments have been considered and the text in chapter D8 (Application Reference Number: 6.4.8) has been updated in addition to associated appendices.
NRW has a number of concerns regarding data assessment. (NRW/D8/25-27,30,33)	These comments have been considered and the text in section 8.3 of chapter D8 (Application Reference Number: 6.4.8) has been updated.
NRW has raised issues regarding the modelling, including the level of detail included and the models ability to represent complex features such as Tre'r Gof SSSI. (NRW/D8/14,28)	The modelling was designed to assess changes at a catchment scale rather than at the micro scale. The level of data required and inherent complexities of heterogeneous aquifers mean that such a level of detailed modelling is not possible. Furthermore, given the nature of

Key issue raised	Action taken
	potential effects on many of the receptors that level of detail is not always warranted. The modelling used is considered appropriate for the scenarios being assessed.
There are inconsistencies between chapter D8, the WFD Compliance Assessment and the Habitats Regulations Assessment. (NRW/D8/23,31,32,39)	The documents have been cross-checked for inconsistencies.
The assessment does not fully assess the potential for saline intrusion. (NRW/D8/37,41)	The potential for a significant saline wedge to be present and for saline intrusion have been considered and the text in chapter D8 (Application Reference Number: 6.4.8) updated.
NRW considers that there is insufficient information to determine the level of significance of effects on a number of groundwater receptors. (NRW/D8/29,34-36,38-40).	Additional information has been added to section 8.5 of chapter D8 (Application Reference Number: 6.4.8), in addition to the supporting sections and appendices, to support the conclusions drawn.
NRW requires more detail regarding the implementation of good practice and procedures to be adopted to manage the risks to the environment. (NRW/D8/42-44)	Additional information is provided in section 8.4 of chapter D8 (Application Reference Number: 6.4.8) and in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and sub-CoCPs (Application Reference Numbers: 8.7 to 8.12).
Appendix D8-3 (Groundwater Baseline Report, Application Reference Number: 6.4.28)	
NRW request more detail regarding ground conditions, and in particular copies of borehole logs. (NRW/D8.03/3,7,9,15, 16,17)	Further information has been provided in appendix D8-3 (Application Reference Number: 6.4.28) in addition to copies of relevant borehole logs.
NRW has a number of concerns regarding some of the terminology used, data interpretation, conceptual models and	These comments have been considered and the text in appendix D8-3 (Application

Key issue raised	Action taken
consistency. (NRW/D8.03/4,5,8,10,11,21 22,23,24,25,27)	Reference Number: 6.4.28) has been updated.
NRW require further assessment of groundwater levels, particularly any differences between those in bedrock and superficial aquifer. (NRW/D8.03/14,15,16,17,18,19,20)	The borehole logs have been further reviewed to characterise ground conditions and the relationship of these to the measured groundwater levels. The text in appendix D8-3 (Application Reference Number: 6.4.28) has been updated to reflect these changes.
Appendix D8-4 FCA (Application Reference Number: 6.4.29)	
NRW request a blockage assessment for fence crossings and an action plan for flood and tidal risks. (NRW/D8.04/4,9,13)	There are no significant watercourse crossings by security fences. Any fences across streams would be low security wire and post type arrangements with little capacity for blockage. The text in appendix D8-4 (Application Reference Number: 6.4.29) has been amended to reflect this and the requirement for an action plan has been added to this appendix.
NRW request clarification regarding water compatibility, rainfall intensity, service life, climate change, flood maps and seasonality. (NRW/D8.04/3,5,6,7,8,14,17)	The text in appendix D8-4 (Application Reference Number: 6.4.29) has been updated to address these comments.
NRW requires clarification of mitigation measures and justification for where professional judgement is used to conclude why mitigation is not required. (NRW/D8.04/11,12)	Additional clarification has been added to the text in appendix D8-4 (Application Reference Number: 6.4.29) regarding mitigation and where/how professional judgement has been used to justify the absence of mitigation. Further information on the general use of professional judgement is included in section 8.4 of this chapter.
NRW has concerns regarding the predicted off-site flood risk and the mitigation that would be implemented. It also has concerns regarding the overall	Further information is included in appendix D8-4 (Application Reference Number: 6.4.29) regarding the predicted risk and

Key issue raised	Action taken
conclusion of the FCA. (NRW/D8.04/15,16)	associated mitigation, and this has been incorporated into the conclusions.
Appendix D8-5 (Tre'r Gof Hydroecological Assessment, Application Reference Number: 6.4.30)	
NRW has concerns regarding the geological model described in the report. (NRW/D8.05/2,11,12,13,18,24,27)	Borehole logs are provided to support the model and an additional cross section has been prepared and additional text included in appendix D8-5 (Application Reference Number: 6.4.30).
NRW has concerns regarding the hydrogeological model, the separation of groundwater in the bedrock and superficial deposits and data interpretation. (NRW/D8.05/3,4,8,9,15,19,20,21,22,23, 26,29,31,39)	Further detail is provided regarding the interpretation of ground and groundwater conditions, supported by borehole logs and cross sections.
NRW is concerned that the flumes may not be recording all of the inflow to the SSSI and that this and other areas are introducing uncertainty into the water balance. (NRW/D8.05/5,6,16,28)	The limitation of the flumes is recognised in the uncertainty in the report and this uncertainty is referred to in the water balance and the report conclusions.
NRW is concerned that the water chemistry has not been fully interpreted. (NRW/D8.05/5/7,32,33,34,35,36,40,42)	The water chemistry data have been further assessed and the text in appendix D8-5 (Application Reference Number: 6.4.30) has been revised.
Appendix D8-6 (Cae Gwyn Hydroecological Assessment, Application Reference Number: 6.4.31)	
NRW has concerns about the amount of data available and the amount of investigation undertaken in preparing the report and the effect of these uncertainties regarding the conclusions drawn. (NRW/D8.06/1,2,5,6,7,9,10,15,16,24,26)	Site access constraints (both land access and health and safety) have significantly limited the amount of data that can be collected and the locations. This has been recognised in statements regarding uncertainty that have been included in the text. Further data collection is not possible at the time of writing.

Key issue raised	Action taken
Further assessment of the water quality is required to better understand the hydrological functioning of the SSSI. (NRW/D8.06/14)	Additional text has been added regarding water quality at Cae Gwyn.
The report should provide more information on vegetation types present and the linkages between vegetation type and hydrology. (NRW/D8.06/4,11,13,17, 18,25)	Where possible additional information has been added regarding vegetation communities, although there have been no new surveys of Cae Gwyn SSSI.
Further information and assessment of groundwater levels and their interaction with Cae Gwyn SSSI is required. (NRW/D8.06/18,19,20,22)	Additional information regarding water levels has been added to the text in appendix D8-6 (Application Reference Number: 6.4.31), including uncertainties where data are limited.
Appendix D8-7 (Surface Water and Groundwater Modelling Results, Application Reference Number: 6.4.32)	
NRW has a number of general comments on the hydraulic modelling and on the groundwater and streamflow modelling methods and content of the reports. (NRW/D8.07/1,2), (NRW/Ground/1,17,24)	The text has been updated to address these comments.
NRW has concerns that the scale of the model is not appropriate to capture hydrogeological changes at a site scale. (NRW/Ground/3)	The scale of the model is designed to look at effects across and around the Wylfa Newydd Development Area, primarily focussing on the implications of dewatering. The model has not been designed to look at small scale/local effects.
NRW has concerns regarding the conceptual model on which the groundwater model has been based, particularly for Tre'r Gof SSSI. (NRW/Ground/4,5,6,8,14,16)	The robustness of the conceptual models has been detailed in appendices D8-3 (Application Reference Number: 6.4.28), D8-5 (Application Reference Number: 6.4.30) and D8-6 Application Reference Number: 6.4.31). The assessment does not indicate that further changes to the groundwater model are required.

Key issue raised	Action taken
NRW has concerns about the flumes and the flow through these as the basis for model calibration. (NRW/Ground/9,18,21)	Further discussion of the use of these data is included in the report, but as this is the only data available other options are limited.
NRW has concerns about how variations in hydraulic conductivity with depth have been included in the model. (NRW/Ground/11,12)	More discussion has been added to the text regarding hydraulic conductivity variations, but the model has not been changed.
Further interpretation is required regarding groundwater levels. (NRW/Ground/15,19)	Additional text has been included in the report to expand on the interpretation of water levels.
Appendix D8-8 (Summary of Preliminary Design for Construction Surface Water Drainage, Application Reference Number: 6.4.33)	
There is limited information available regarding some elements of the design of the drainage system and some elements require further refinement or modification. (NRW/D8.08/1,6,7,9,11,13,20,21,25)	The design is an outline design. The detail will be provided post award of the DCO when the detailed design of the drainage will be undertaken.
Insufficient information is provided regarding the 70mg/l limit used for the outflows from the drainage system. (NRW/D8.08/3,5,10,18,23)	Appropriate suspended sediment limits have been reviewed and further justification has been provided.
The effect of polyelectrolyte dosing requires further comment. (NRW/D8.08/2,4)	The effects of polyelectrolyte dosing are considered in section 8.5 in chapter D8 (Application Reference Number: 6.4.8).
The options for hydroseeding without nutrient, or the effect of nutrient flushing need considering. (NRW/D8.08/8,19,26)	The effects of hydroseeding are considered in section 8.5 in chapter D8 (Application Reference Number: 6.4.8).
Further information is required regarding the effect of changes adjacent to Cae Gwyn, including the car park and proximity of Mound C. (NRW/D8.08/14,16)	The potential effects of development activities adjacent to Cae Gwyn are considered in section 8.5 in chapter D8 (Application Reference Number: 6.4.8).
Further information on management activities is required. (NRW/D8.08/21,24,27,28)	Management activities would be considered as part of the detailed design.

Topic-specific stakeholder engagement

8.3.15 In addition to the three formal stages of consultation outlined above, topic-specific consultation has been undertaken with relevant stakeholders. Table B8-10 summarises the details of the consultation that has taken place with respect to the surface water and groundwater assessment.

Table B8-10 Summary of topic-specific consultation

Date	Stakeholder	Title and format	Issues arising	Action taken
17 Oct 2014	NRW and the IACC	Technical note: Wylfa Newydd hydrology – surface and groundwater monitoring.	Historical, ongoing and proposed surface water and groundwater monitoring note prepared to inform stakeholders regarding historical, ongoing and proposed data collection.	NRW and the IACC provided comments regarding the scheme in a letter of 10 November 2014. The monitoring plan was then instigated as set out in appendices D8-1 (Application Reference Number: 6.4.26) and D8-2 (Application Reference Number: 6.4.27).
4 Mar 2015	NRW and the IACC	Meeting and technical note: Modelling of the water environment and assessment methodology – non-radiological emissions.	Preparation of a document and a meeting to present the work that would be undertaken in relation to surface water and groundwater modelling.	Surface water and groundwater modelling was undertaken on the approach presented as reported in appendix D8-7 (Application Reference Number: 6.4.32).
11 Mar 2015	NRW and the IACC	Meeting: Fluvial geomorphology and the WFD.	Methodology for the fluvial geomorphology baseline and effects assessments. This included initial consultation on the WFD water bodies and compliance assessment to agree the methodologies for the proposed assessments.	The fluvial geomorphology assessment (chapter D8, Application Reference Number: 6.4.8) has been produced on the basis of the discussions. Further conference calls and meetings were held with respect to the WFD Compliance Assessment (Application Reference Number: 8.26) and an approach to the assessment agreed.
27 Jul 2015	NRW	Meeting: Pumping tests.	Scope and method of groundwater pumping tests designed to obtain	Pumping tests were undertaken following the discussions as

Date	Stakeholder	Title and format	Issues arising	Action taken
			information on aquifer permeability and groundwater flow paths.	reported in appendix D8-3 (Application Reference Number: 6.4.28).
14 and 25 Sept 2015	NRW and the IACC	Conference call: Hydrological assessments at the Tre'r Gof SSSI.	Call with planning liaison team (14 September) and technical experts from NRW (25 September) to discuss the findings of hydrological investigations completed at the Tre'r Gof SSSI and to agree the proposed monitoring regime at and around the feature.	A monitoring programme was put in place on the basis of the discussions and reported in appendix D8-5 (Application Reference Number: 6.4.30.
17 Sept 2015	NRW	Conference call: WFD assessment	Format and contents of WFD assessments.	WFD assessment reports have been produced in line with discussions and agreements from the meeting as shown in the WFD Compliance Assessment (Application Reference Number: 8.26).
18 Apr 2016	NRW and the IACC	Conference call: Tre'r Gof SSSI.	Findings of the monitoring at Tre'r Gof, changes to the baseline conditions, conceptual hydrological modelling and hydroecological interactions at the SSSI.	Outcomes fed into the Tre'r Gof hydroecology report (appendix D8-5, Application Reference Number: 6.4.30).
25 May 2016	NRW	Meeting: Abstraction licensing	Implications and requirements for abstractions, Environmental Permits and modelling.	Feedback from NRW has been used for applying for a licence for abstraction for de-watering during construction.
19 July 2016	NRW and the IACC	Meeting: Tre'r Gof SSSI	Hydrology of Tre'r Gof and the preliminary drainage designs and	Outcomes of the meeting fed into the drainage design for discharges into the Tre'r Gof SSSI including the

Date	Stakeholder	Title and format	Issues arising	Action taken
			construction as part of the assessment of effects.	use of appropriate chemicals for water treatment and to consider limits for suspended solid concentrations.
15 Sept 2016	NRW	Meeting: Hydrology (Groundwater) Modelling Methodology	Proposals for interpretation of the significance of the modelling predictions for the hydroecology of groundwater-dependent SSSIs and streams, the groundwater body quantitative status risks, and PWS receptors.	Outcomes of the meeting fed into the reporting of the groundwater modelling work produced in appendix D8-7 (Application Reference Number: 6.4.32).
27 Oct 2016	NRW	Conference call: for FCA for application for the DCO	A meeting with NRW to approve or change the FCA methodology (incorporation of the lifetime of the development to assess the probability of hazard) based on review of the SPC FCA. Set greenfield and brownfield runoff rates, and state the climate change allowance to be incorporated for river flows.	Outcomes of the meeting fed into the drainage design and the FCAs produced for the Power Station Site, Off-Site Power Station Facilities and Associated Development sites (see appendices D8-4, Application Reference Number: 6.4.29; E8-1, Application Reference Number: 6.5.16; F8-1, Application Reference Number: 6.6.16; G8-1, Application Reference Number: 6.7.20; and H8-1, Application Reference Number: 6.8.16).
14 Dec 2016	NRW	Meeting: Preliminary WFD assessment	Preliminary WFD assessment and comments on the Pre-Application Consultation Stage Two, including Article 4.7	Feedback was used to inform the WFD Compliance Assessment (Application Reference Number: 8.26). Formal comments from NRW on the Preliminary WFD assessment were subsequently

Date	Stakeholder	Title and format	Issues arising	Action taken
				received. A WFD working group was set up. It was agreed that technical memos would be prepared for key aspects to facilitate discussions.
13 Feb 2017	NRW and the IACC	Meeting: Cae Gwyn SSSI	Hydrology at Cae Gwyn and key issues with regard to potential effects.	Outcomes fed into the Cae Gwyn hydroecology report (appendix D8-6, Application Reference Number: 6.4.31)
23 Feb 2017	NRW	Meeting and conference call: WFD working group meeting 1	Technical memos and ongoing actions.	NRW's comments on the technical memos on Article 4.7, temporary and non-temporary effects and migratory fish were discussed. Formal comments from NRW were subsequently received and considered in relation to the WFD Compliance Assessment (Application Reference Number: 8.26).
5 Apr 2017	NRW	Meeting: WFD working group meeting 2	NRW's comments on the Preliminary WFD assessment and technical memos. Presentation of the methodology and format of the WFD Compliance Assessment (Application Reference Number: 8.26).	Feedback was used to inform the WFD Compliance Assessment (Application Reference Number: 8.26).
12 Apr 2017	NRW and the IACC	Meeting: Wylfa Newydd DCO. Technical Modelling for	Preliminary modelling works and presentation within the Environmental Statement.	Outcomes from the meeting have fed into the modelling report presented in appendix D8-7

Date	Stakeholder	Title and format	Issues arising	Action taken
		surface water and groundwater		(Application Reference Number: 6.4.32) and in the FCA appendices for each area of the development (D8-4, Application Reference Number: 6.4.29; E8-1, Application Reference Number: 6.5.16; F8-1, Application Reference Number: 6.6.16; G8-1, Application Reference Number: 6.7.20; and H8-1, Application Reference Number: 6.8.16).
8 May 2017	DCWW	Meeting and conference call: Water supply to Wylfa Newydd during construction and operation of the power station	Proposals for water supply and disposal of foul water for the Wylfa Newydd Project.	Discussion required with NRW regarding DCWW's supply assessment and proposals for meeting the predicted water shortage and requirements for the Wylfa Newydd Project.
9 and 10 May 2017	NRW	Meeting: Environmental issues workshop	This covered all common areas of interest, including potential effects on wetland SSSIs, WFD Compliance Assessment (Application Reference Number: 8.26), foul drainage discharges and surface water discharges.	Outcomes of this meeting have fed into the various assessments and has informed subsequent more detailed discussions.
19 May 2017	NRW and DCWW	Meeting and conference call: Water supply to Wylfa Newydd during construction and	Proposals for water supply and disposal of foul water for the Wylfa Newydd Project and how the effects from theses	DCWW to look at total number of workers coming onto Anglesey and to look at options for supply and discuss these with NRW as part of the normal supply planning process.

Date	Stakeholder	Title and format	Issues arising	Action taken
		operation of the power station	should be assessed within this Environmental Statement.	New pipeline effects to be included in cumulative section of the Environmental Statement (chapter I5, Application Reference Number: 6.9.5). DCWW to look at capacity of existing treatment works to determine what it can treat and what will need treating via an on-site treatment works.
28 June 2017	NRW	Meeting and conference call: Groundwater modelling and the WFD	4R and MODFLOW models and explanation of functionality and assumptions to allow NRW staff to gain a better understanding to inform their review of the modelling report.	No specific actions arising.
18 July 2017	NRW	Meeting: Hydroecological assessments at the Tre'r Gof and Cae Gwyn SSSIs	Updated hydroecology conceptual site models for the Tre'r Gof and Cae Gwyn SSSIs to inform NRW staff of the data collection, assessment and models that have been formulated.	Review and revision of reports required to further evaluate ground conditions and to include greater reference to uncertainty in the assessments. In addition, a number of specific comments were made to address in the text.
9 August 2017	Magnox	Meeting and conference call: External hazards between the adjacent	Provide a background and framework for ongoing liaison on external hazards between the adjacent Horizon and Magnox sites. Discussion of potential effects of the groundwater dewatering on	Magnox/Horizon agreed key issues to be discussed and agreed and agreed exchange of relevant information.

Date	Stakeholder	Title and format	Issues arising	Action taken
		Horizon and Magnox sites	ancillary buildings at the Existing Power Station associated with the potential for subsidence.	
14 September 2017	NRW	Meeting: Construction Phase Water Discharge EP and Groundwater Abstraction Licence meeting	Proposals for surface water drainage and the application for Environmental Permits for discharges from construction activities.	Review of drainage proposals and activities included in the permit applications and a review of the limits suggested for suspended sediment discharges.
16 November 2017	NRW	Meeting: Construction water discharge to Nant Cemlyn	The available baseline information regarding the ecology and hydrology of Cemlyn lagoon and the implications of discharges to Nant Cemlyn on the lagoon.	Horizon to review proposals currently in place for the drainage around the mounds and the implications of discharges to the Nant Cemlyn.
22 January 2018	NRW	Meeting: Construction Water Discharge EP	Approach, programme, H1 assessment, suspended sediment discharge limits	Horizon to revise the approach to setting discharge limits for suspended sediment from outfalls during construction.

8.4 Topic-specific methodologies and assessment criteria

Introduction

8.4.1 The overarching approach to the EIA, including the approach to the assessment of cumulative effects, is provided in chapter B1 (introduction to the assessment process) (Application Reference Number: 6.2.1). This section outlines the specific methodology used to assess the effects of the Wylfa Newydd Project on surface water and groundwater. It outlines the methods and criteria used to:

- define the study area and identify topic receptors;
- establish the environmental baseline for topic receptors; and
- determine the value/sensitivity of receptors, the magnitude of change and significance of effect.

Assessment of parameters

8.4.2 As outlined in chapter B1 (Application Reference Number: 6.2.1), the approach adopted for the design of the WNDA Development, Off-site Facilities and Associated Development is to set parameters, where necessary, for the extent of the development and key aspects of that development. The final design and construction methodology would be limited to these parameters and limits of deviation. As these parameters and limits of deviation vary between the various developments in the Wylfa Newydd Project they are considered on a site specific basis in chapter 8 within volumes D (Application Reference Number: 6.4.8), E (Application Reference Number: 6.5.8), F (Application Reference Number: 6.6.8), G (Application Reference Number: 6.7.8) and H (Application Reference Number: 6.8.8).

Identification of study areas

8.4.3 The study areas have been defined based on an understanding of the potential for changes to be brought about by the developments comprising the Wylfa Newydd Project and focuses the assessments on those locations where there is the potential to experience an effect. Study areas for the three sub-topic areas (hydrology, fluvial geomorphology and hydrogeology) are provided in chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8). The study areas for each sub-topic are defined differently as described below. As the study area for the A5025 Off-line Highway Improvements is linear, it has been defined in a slightly different manner to the other areas; this is considered separately below.

Surface water

8.4.4 The surface water assessment study areas have been determined by an examination of the surface water bodies that could, in theory, be affected by

the works and the land areas that drain to these features. The surface water study areas are therefore based on the major stream catchments at and around each development area and, where relevant, include important surface water features including SSSIs. As the natural stream catchments extend outside of the Power Station Site, Off-Site Power Station Facilities and Associated Development sites, the study areas include areas of land upstream of the developments between the development sites and the study area boundaries. Similarly, the effects on the streams and associated receptors downstream but outside of these development sites are covered by these study areas.

8.4.5 In addition, where relevant, the study areas extend to the coast including areas between the surface water catchments and the shoreline, as these areas of land drain directly to the coast rather than to an identified watercourse.

Fluvial geomorphology

8.4.6 The fluvial geomorphology study areas have been defined to reflect watercourses that have been identified as fluvial geomorphology receptors or where the fluvial environment has a potential pathway that could lead to effects on the coastal environment. The study areas are based on stream catchments extending out to a buffer of 1km from the site boundaries so that consideration is given to associated upstream and downstream watercourses, to ensure all surface water features of relevance are captured.

Groundwater

8.4.7 Due to the scale of the proposed works at the Power Station Site and the nature of the aquifer, there are significant uncertainties regarding the radius of potential effects to groundwater receptors. Therefore, a conservative approach to the assessments has been taken by identifying two zones for the groundwater study areas.

- An inner study area centred on the site being assessed. The boundaries have been selected as a circular area (albeit truncated by the coast where applicable) to reflect the nature of groundwater movement and the potential radius of influence of dewatering activities, which in homogeneous aquifers will be circular in nature. The inner study area captures all of the groundwater features considered to have the highest potential of being affected by the development.
- An outer study area has also been defined in order to capture residual uncertainty associated with the radius of influence calculations, especially the degree of heterogeneity of the aquifer, and the possibility that potential effects may extend further than the inner study area. The outer study areas are based on professional judgement regarding how secondary fractured aquifers behave and the maximum likely distance across which the proposed activities could have an effect. This outer study area allows all relevant features that could be of concern to the public and regulators to be assessed, even where the potential effect is assessed as being extremely low.

8.4.8 For the Off-Site Power Station Facilities and Associated Development, the groundwater study areas have been set at a 1km radius around each site. This area has been set based on professional judgement and an understanding of the nature and extent of the development, and in particular the limited potential for effects on groundwater.

A5025 Off-line Highway Improvements

8.4.9 The Design Manual for Roads and Bridges, Volume 11, Section 2 Part 5, Assessment and Management of Environmental Effects [RD27] states that:

"*The study area for the assessment should be defined on a case-by-case basis reflecting the project and the surrounding environment over which significant effects can reasonably be thought to have the potential to occur…..*"

Therefore, for the A5205 Off-line Highway Improvements, the study area for surface water, including fluvial geomorphology, covers any water features within 500m of the Off-line Highway Improvements. This distance has been set based on professional judgement to gain a sufficient understanding of the water features upstream and downstream of the scheme and is considered to be commensurate with the surrounding environment and the scale of the proposed changes.

8.4.10 Where watercourses cross the carriageway or there are any designated sites downstream of an outfall, the assessment has been extended to a distance of 1km. This extended distance incorporates a sufficient distance upstream and downstream of any watercourses to assess potential effects. Where specific flow pathways to sensitive receptors (such as ecologically designated sites) have been identified, a wider study area has been considered to capture any potential changes in flow or water quality downstream arising from the A5025 Off-line Highway Improvements.

8.4.11 Due to the linear nature of the A5025 Off-line Highway Improvements, taking the approach of defining circular study areas for hydrogeology is not appropriate. Therefore, for the A5205 Off-line Highway Improvements, the study area for groundwater has extended to a minimum distance of 250m either side of the A5025 Off-line Highway Improvements (see chapter G8, Application Reference Number: 6.4.8). This distance has been set based on professional judgement and is commensurate with the nature and scale of the proposed changes and the very limited potential for effects on groundwater.

Identification of receptors

8.4.12 The receptors for this topic have been selected based on an understanding of the potential for direct or indirect effects from construction, operation or decommissioning. The receptors have been determined using professional judgement following review of data collected from a number of sources. These data sources are fully detailed in the baseline reports (see appendices D8-1, Application Reference Number: 6.4.26), D8-2 (Application Reference Number: 6.4.27) and D8-3 (Application Reference Number: 6.4.28) but include:

- Publically available information contained in websites (including those of the Welsh and UK Governments, British Geological Survey, NRW and

the Environment Agency) to identify sites of nature conservation such as wetland SSSIs, aquifers and WFD water bodies.

- Site-specific data provided by the IACC and NRW including the location of private and former public water supplies.
- Ordnance Survey mapping and LiDAR (Light Detection and Ranging) data to determine streams and stream catchments.
- Aerial photography.
- Site walkovers to verify map information and identify features not included on Ordnance Survey maps. The site walkovers also enabled seasonal changes of hydrological features to be identified.
- Ground investigation works identifying the presence of groundwater. However, ground investigations have not been undertaken at sites where the potential for effects on groundwater has been determined to be low.

Identification of baseline conditions

8.4.13 In order to establish the baseline conditions within each study area, a programme of data collection has been undertaken for the sub-topic areas as shown below. These data sources are summarised below and are set out in detail within chapters D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8).

Surface water

8.4.14 The surface water baseline for each development area is based on a combination of;

- desk studies;
- site walkovers;
- site surveys;
- field monitoring; and
- hydrological and hydraulic modelling.

8.4.15 For the Power Station Site, this has included the installation of instruments to continually monitor and record stream flow and surface water quality. Modelling has been undertaken to determine the baseline flood risk at the Power Station Site (chapter D8, Application Reference Number: 6.4.8), Off-Site Power Station Facilities (chapter E8, Application Reference Number: 6.5.8), Park and Ride (chapter F8, Application Reference Number: 6.6.8) and for Sections 1 and 5 of the A5025 (chapter G8, Application Reference Number: 6.7.8). Meteorological data have been collected from the Power Station Site and Meteorological Office weather stations with modelled rainfall data also used for modelling studies.

Fluvial geomorphology

8.4.16 The establishment of baseline conditions for the fluvial geomorphological conditions has involved a review of the desk-based information collected for each study area and geomorphological reconnaissance surveys of the relevant watercourses to assess physical features, sediment inputs and catchment pressures.

Groundwater

8.4.17 The baseline conditions for groundwater have been characterised through site walkovers, the analysis of a variety of data sources including desk studies of available information and site-specific data collected on soils and geology. Investigation works on the Power Station Site and A5025 Off-line Highway Improvement sites have been undertaken to collect further information on groundwater levels and groundwater quality.

Modelling methodologies

8.4.18 Modelling studies have been undertaken to further assess the effects of the Wylfa Newydd Power Station on surface waters and groundwaters, and their associated receptors. In addition, flood modelling of surface water has been undertaken at the sites where this is necessary due to flood risk; the Off-Site Power Station Facilities (chapter E8, Application Reference Number: 6.5.8); the Park and Ride (chapter F8, Application Reference Number: 6.6.8); and Sections 1 and 5 of the A5025 (chapter G8, Application Reference Number: 6.7.8). Due to the nature of the likely effects, modelling the effects of the Wylfa Newydd Power Station on the fluvial geomorphology is not appropriate and has not been undertaken.

Surface water

8.4.19 As detailed in the hydrological baseline report and modelling summary report for the Wylfa Newydd Power Station (appendices D8-1, Application Reference Number: 6.4.26 and D8-7, Application Reference Number: 6.4.32), the baseline understanding of the surface water systems has been further refined through modelling studies. The models consider how the Power Station is likely to alter the movement of water through the Wylfa Newydd Development Area.

8.4.20 The modelling undertaken for the Wylfa Newydd Power Station in relation to hydrology can be divided into flood modelling, long-term hydrological modelling and wave modelling as outlined below. For the other sites listed above the modelling only relates to flood modelling.

Flood modelling

8.4.21 Flood modelling has been undertaken by Amec Foster Wheeler to inform this EIA, a summary of the modelling and results for the Power Station Site are provided in the model summary report (appendix D8-4, Application Reference Number: 6.4.29) with modelling results for the Off-Site Power Station Facilities, the Park and Ride and Sections 1 and 5 of the A5025 provided in appendix E8-1 (Application Reference Number: 6.5.16), F8-1 (Application

Reference Number: 6.6.16) and G8-1 (Application Reference Number: 6.7.20). The flood models are linked 1D-2D models of pluvial and fluvial flows; these models have assessed outputs for a variety of flood probabilities and storm durations to identify the critical storm for both pluvial and fluvial flows. In order to accommodate future climate change, in line with the modelling has been undertaken for three future scenarios: the 2020s, the 2080s and the 2180s. The model has also been run for construction and operational scenarios. It should be noted that the effects of the construction works on the surrounding environment (rather than the effects of the environment on the proposals) in relation to flooding are considered at an Annual Exceedance Probability (AEP) of 1%. This is in line with Welsh Government Policy as detailed in the FCAs.

Long-term hydrological modelling

8.4.22 Modelling using the 4R modelling package has also been undertaken; this considers the more 'normal' behaviour of the hydrological system including the response under longer duration (weeks to months) extreme wet or dry conditions. This takes a long-term daily rainfall series and assesses how this would be routed through the study area via both surface and shallow sub-surface flow pathways and what recharge to groundwater would take place.

Wave modelling

8.4.23 Wave modelling has been undertaken to address the modelling, analysis and results requirements for environmental and permitting issues, including any risk of coastal flooding to the Wylfa Newydd Development. This modelling, undertaken by HR Wallingford, includes offshore and nearshore scenarios for wave modelling through the use of a SWAN (Simulating Waves Nearshore) wave transformation model, based on a 35-year time series of offshore wave data. The outputs of this modelling are relevant to the FCA, as well as other chapters including the marine environment (chapter D13, Application Reference Number: 6.4.13). This modelling has included climate change scenarios as detailed in appendix D8-4 (Application Reference Number: 6.4.29).

Groundwater modelling methodology

8.4.24 Recharge (i.e. the amount of rainfall which reaches the groundwater) and shallow groundwater flow modelling is being undertaken as part of the drainage design works to allow an estimate of stream flows and discharge volumes in the streams and from surface water drainage to be made. This is discussed further in the surface water modelling section of chapter D8 (Application Reference Number: 6.4.8) of this Environmental Statement.

8.4.25 The primary function of a groundwater model is in the prediction of groundwater levels and flows across the study area, and potential changes in groundwater levels that may arise from the proposed activities. Changes in groundwater levels are most likely to come about due to dewatering operations associated with, for example, construction of deep basements. To assess these effects, groundwater modelling of the deep (bedrock) groundwater system has been undertaken and is reported in appendix D8-8

(Application Reference Number: 6.4.32). The modelling approach was discussed with NRW prior to implementation (see table B8-9).

8.4.26 As the major effects on groundwater are anticipated to occur, in the relatively near-future (that is during the construction works), climate change scenarios are not considered in the groundwater model. However, the groundwater modelling has considered various recharge rates to groundwater in the bedrock (see appendix D8-7, Application Reference Number: 6.4.32) for further details of the groundwater model).

Assessment of effects

8.4.27 There are no published technical guidance criteria for assessing and evaluating effects on hydrology, fluvial geomorphology or hydrogeology within the context of an EIA. The following assessment is therefore based on the general EIA methodology outlined in chapter B1 (Application Reference Number: 6.2.1) and includes the following criteria for evaluating the environmental effects:

- the importance (value) of the resource under consideration on a scale of sensitivity (i.e. high, medium, low or negligible);
- the magnitude of the effect in relation to the resource that has been evaluated, quantified using the scale large, medium, small or negligible; and
- the significance of the effect using the scale major, moderate, minor and negligible. For significant effects (moderate and major), additional mitigation may be required to reduce the significance of the effect.

Value of receptors

8.4.28 Table B8-11 sets out the criteria for determining the value (i.e. level of importance) of water related features. The values have been derived to reflect the importance of features outlined in key policy documents.

Magnitude of change

8.4.29 The magnitude of the change (table B8-12) is a measure of the scale or extent of the change in the baseline condition, irrespective of the value of the receptor(s) affected. In determining magnitude, the extent of the physical change would be considered in the context of other factors such as the likelihood of effect, existing long-term trends, the timescale over which the effect occurs and whether the effect is temporary or permanent.

Table B8-11 Criteria for determining the value of identified receptors

Value	Generic criteria	Surface water, fluvial geomorphology and groundwater specific criteria
High	High importance and rarity, national scale, and	• Water feeding sites with a high environmental importance and international or national value, including Ramsar sites; SACs; Special Protection Areas; SSSIs; and internationally and

Value	Generic criteria	Surface water, fluvial geomorphology and groundwater specific criteria
	limited potential for substitution	nationally important groundwater dependent terrestrial ecosystems (GWDTEs). • Nationally and regionally important watercourses. • A watercourse that appears to be in complete natural equilibrium and exhibits a natural range of morphological features (such as pools and riffles). There is a diverse range of fluvial processes present, free from any modification or anthropogenic influence. • Groundwater or surface water public water supplies. • Groundwater or surface water PWSs serving more than 50 properties, or properties where there is no other viable source of water supply (e.g. water main is greater than 3km distant). • Nationally important fisheries. • Principal aquifers with high aquifer vulnerability. • Buildings of regional or national importance, all occupied residential properties and infrastructure of national importance.
Medium	High or medium importance and rarity, regional scale, and limited potential for substitution	• Important in the context of the region including watercourses or water bodies. • Main rivers within a catchment, locally important watercourses. • A watercourse that appears to be in natural equilibrium and exhibits a natural range of morphological features (such as pools and riffles). There is a diverse range of fluvial processes present, with very limited signs of modification or other anthropogenic influences. • PWSs serving three or more (but fewer than 50) properties and where viable alternative supplies are available. • Regionally important fisheries. • Groundwater that supports highly dependent GWDTEs which are not designated.

Value	Generic criteria	Surface water, fluvial geomorphology and groundwater specific criteria
		• Principal aquifers with low vulnerability or Secondary A aquifers. • Vacant residential properties, buildings for local industrial/commercial use and infrastructure of regional or local importance.
Low	Low or medium importance and rarity, local scale	• Low or local environmental importance. • Minor watercourses or water bodies. • Degraded fisheries or receptor not important for fisheries. • A watercourse showing signs of modification and recovery to a natural equilibrium and currently exhibiting a limited range of morphological features (such as pools and riffles). The watercourse is one with a limited range of fluvial processes affected by modification or other anthropogenic influences. • PWSs located within the vicinity of a mains water supply or PWSs used for agricultural purposes and not for drinking water purposes and where viable alternative supplies are available. • Groundwater that supports un-designated moderately dependent GWDTE. • Low productivity aquifer, which will often correspond to a Secondary B aquifer. • Industrial buildings that are currently not utilised, all derelict buildings and infrastructure that serves a single dwelling.

Value	Generic criteria	Surface water, fluvial geomorphology and groundwater specific criteria
Negligible	Very low importance and rarity, local scale	• A highly-modified watercourse that has been changed by channel modification or other anthropogenic pressures. The watercourse currently exhibits no morphological diversity and has a uniform channel, showing no evidence of active fluvial processes and not likely to be affected by modification. • Groundwater that supports a wetland not classified as a GWDTE, although may receive some minor contribution from groundwater. • Not classified as an aquifer under WFD, i.e. water bearing stratum identified through ground investigation that is not classified ('Unproductive Strata').

Table B8-12 Criteria for magnitude of change for surface water, geomorphology and groundwater

Receptor	Characteristics	Magnitude of change and criteria			
		Large	Medium	Small	Negligible
Surface watercourses	Water quality	Measurable change in water quality status with respect to EQSs for more than one month with long-term irreversible effect on aquatic ecosystems.	Measurable change in water quality status with respect to EQS for less than one month with a temporary effect on aquatic ecosystems in the medium term.	measurable change in water quality but no change with respect to EQS. No significant effect on aquatic ecosystems.	No measurable change in surface water quality.
	Water availability	Long-term change in the flow of water within a water body equivalent to +/- 10% (or more) of Q95*, or, +/- 60% (or more) of flows above Qn90*. Equivalent changes in catchment area can also be used where flows are naturalised.	Long-term change in the flow of water within a water body equivalent to between +/- 5% and +/- 10% of Q95 or between +/- 30% and +/- 60% of flows above Qn90, or, a temporary change equivalent to +/- 10% (or more) of Q95 or +/- 60% (or more) of flows above Qn90. Equivalent changes in catchment area can also be used where flows are naturalised.	Long-term change in the flow of water within a water body of up to +/- 5% of Q95 or up to +/- 30% of flows above Qn90, or, a temporary change equivalent to less than +/- 10% of Q95 or less than +/- 60% of flows above Qn90. Equivalent changes in catchment area can also be used where flows are naturalised.	No measurable change in water volume or flow within a water body.
		Note: these criteria are derived from [RD29] and are applicable to larger watercourses. Professional judgement is			

Receptor	Characteristics	Magnitude of change and criteria			
		Large	Medium	Small	Negligible
		applied for smaller watercourses, particularly those that dry up or cease to flow.			
	Runoff regime/ flooding	Long-term irreversible change in overall volume of runoff from the surface water study area and changes to flow paths and rates resulting in change to flood risk and erosion potential. Any increase in flooding to off-site built receptors or internationally or nationally designated sites.	Temporary change, over a medium time period, in overall volume of runoff from the surface water study area and changes to flow paths and rates resulting in change to flood risk and erosion potential.	Short-term change in volume of runoff and changes to flow paths and rates in localised areas of the surface water study area resulting in change to flood risk and erosion potential to localised areas only.	No measurable change in runoff regime across the surface water study area.
	Fluvial geo-morphology	Loss or extensive damage to geomorphological habitat and processes due to extensive modification and/or fine sediment input. Replacement of a large extent of the natural bed and/or banks with artificial material. Extensive	Partial loss or damage to geomorphological habitat and processes due to modifications and/or fine sediment input. Replacement of the natural bed and/or banks with artificial material (total length is more than 3% of water body length).	Slight change or deviation from baseline conditions, or partial loss or damage or improvement/ gain to in-channel habitat and geomorphological processes due to modifications and/or fine sediment input.	Very slight change from surface water baseline conditions, approximating to a 'no change' situation.

Receptor	Characteristics	Magnitude of change and criteria			
		Large	Medium	Small	Negligible
		change to channel planform.			
Secondary Aquifer	Recharge and flow	Irreversible or permanent change to the recharge, flow or discharge of groundwater. May have a large effect on PWSs or licensed groundwater abstractions, supply to ecosystem or groundwater base flow to a watercourse. Affects the WFD status. Affects large or multiple area(s).	Measurable but temporary change to the recharge, flow or discharge of groundwater. Limited effect on PWSs or licensed groundwater abstractions, supply to ecosystem or groundwater base flow to a watercourse but with no effect on WFD status. Affects moderate size area.	Short-term reversible changes to the recharge, flow or discharge of groundwater. Effects are limited to small discrete areas.	No measurable change in the recharge, flow or discharge of groundwater
	Water levels	Irreversible or permanent change to groundwater levels (greater than 1m change in level) over a large area. May affect PWSs or licensed groundwater abstraction, supply to ecosystem or groundwater base flow to a watercourse such that it	Measurable permanent change to groundwater levels of less than 1m over a large area or over 1m to a local area or on a temporary basis. May affect PWSs or licensed groundwater abstraction, supply to ecosystem or groundwater base flow to a watercourse but with no effect on	Short-term, reversible or minor changes to groundwater levels. Effects are limited to small discrete areas.	No measurable change in groundwater levels.

Receptor	Characteristics	Magnitude of change and criteria			
		Large	Medium	Small	Negligible
		affects the WFD status. Affects large or multiple area(s).	WFD status. Affects moderate-size area.		
	Quality	Permanent or long-term change in groundwater quality with respect to Water Quality Standards resulting in widespread exceedances of Water Quality Standards such that it affects the WFD status. Change in groundwater quality within the whole of the Wylfa Newydd Development Area and beyond.	Temporary change in groundwater quality, changing site quality with respect to Water Quality Standards for several months. Change in groundwater quality over the majority of the Wylfa Newydd Development Area or beyond the area of Off-Site Power Station Facilities or area of Associated Development but with no effect on WFD status.	Measurable but temporary change in groundwater quality, but not changing quality with respect to Water Quality Standards. Local in extent and confined to within the Wylfa Newydd Development Area, the Off-Site Power Station Facilities or area of Associated Development.	No measurable change in groundwater quality.
Groundwater movement to Statutory Designated GWDTE	Nutrient status:	Nitrogen, potassium or phosphate exceeds threshold value [RD30] or concentration for good condition by more than 2x or for more than 1 year.	Nitrogen, potassium or phosphate exceeds threshold value [RD30] or concentration for good condition by up to 2x for up to 1 year.	Measurable change, but nutrients remain below UKTAG threshold value [RD30] or concentration for good condition.	No measurable change

Receptor	Characteristics	Magnitude of change and criteria			
		Large	Medium	Small	Negligible
	Acid/base status:	pH status changes by 2 pH units or more for greater than 1 year.	pH status changes less than 2 pH units for less than 1 year.	Measurable change in pH, but overall acid/base status unchanged	No measurable change
	Water level change (permanently saturated wetland):	GWDTE becomes unsaturated for more than 4 months per year or for more than 1 month for more than 2 or more consecutive years.	GWDTE becomes unsaturated for less than 4 months per year for no more than 2 consecutive years.	Measurable change, but feature remains permanently saturated.	No measurable change
	Water level change (seasonally saturated wetland):	GWDTE becomes permanently unsaturated for more than one year.	GWDTE becomes permanently unsaturated, but for less than one year.	Measurable change, but seasonal saturation remains.	No measurable change
PWSs	Water quality and quantity	Significant change in water quality (as per the Water Supply (Water Quality) Regulations 2010) or a significant change in volume of water available for supply leading to a substantial change in water pressure	Measurable change in quality (as per the Water Supply (Water Quality) Regulations 2010) for more than 10% of samples (from one PWS) or a moderate change in the volume of water available for supply, or temporary visual colouration change and alteration to	Measurable change in quality for less than 10% of samples (from one PWS), but no change with respect to the Water Supply (Water Quality) Regulations 2010, or a minor change to the volume of water available for supply	No measurable change in water supply.

Receptor	Characteristics	Magnitude of change and criteria			
		Large	Medium	Small	Negligible
		and/or in supply volumes.	sediment content.	abstraction but with no change in pressure or flow.	
Buildings/ infrastructure	Subsidence due to lowering of groundwater levels	Damage to building that could lead to catastrophic failure (building collapse) or requirement for demolition of the building. Costs >£100k. Damage to infrastructure resulting in risk to human life or severe environmental effects.	Damage to building leading to the building requiring extensive works to retain structural integrity (typical cost >£10k, but <£100k). No catastrophic risk to building. Damage to infrastructure resulting in medium risk to health or moderate environmental effects.	Damage to building leading to the requirement for localised remedial works to repair structure, but no risk of any collapse (typical cost <£10k). Damage to infrastructure resulting in low risk to health or minor environmental effects.	Change in groundwater levels but no noticeable damage to building or infrastructure.

* Q95 is the flow in a watercourse that is exceeded for 95% of the time whilst Qn90 is the natural low flow (i.e. the flow in the absence of abstractions) that would be exceeded for 90% of the time.

Assessment of significance

General approach

8.4.30 Across the Wylfa Newydd Project, the approach in general is to consider that an environmental effect may be significant if, in the professional judgement of the expert undertaking the assessment, it would meet at least one of the following criteria:

- it leads to an exceedance of defined guidelines or widely recognised levels of acceptable change (which will be different for different topics within the EIA);
- it is likely that the consenting authority will reasonably consider applying a planning condition, requirement or legal agreement to the consent to require specific additional mitigation to reduce or overcome the effect;
- it threatens or enhances the viability or integrity of a receptor or receptor group of concern; or
- it is likely to be material to the ultimate decision about whether or not the planning application should be approved.

8.4.31 To aid the determination of significance, the assessment of effects for groundwater and surface water has taken the following stepped approach:

- determine the relevant receptors by considering the potential for effects from construction, operation and decommissioning based on information gained in the baseline studies, the modelling studies and the CSMs derived for each area of the development;
- derive their value (importance) based on the criteria set out in table B8-11;
- identify and consider the effects from each activity;
- determine the magnitude of change likely as a result of the effects (Table B8-12); and
- present the environmentally and ecologically significant effects and then consider how additional mitigation may reduce negative effects.

8.4.32 The potential effect significance is presented as either major; moderate; minor; or negligible as detailed in chapter B1 (Application Reference Number: 6.2.1). As there is not a fixed matrix that defines the relationship between the value of a receptor and the anticipated magnitude of change (other than the indicative guide presented in figure B1-2, Application Reference Number: 6.2.1), professional judgement is used to ascribe the significance of the effect, albeit based on the parameters outlined above. This professional judgement addresses uncertainty in the likely effects that can be due to a range of issues including data collection and natural variations in the water environment. In general, a conservative approach is taken such that if there is a high level of uncertainty, where an effect could be in one of two categories, it is the higher category that is selected.

8.4.33 Examples of where professional judgement would be used in the surface water and groundwater assessment include, for example:

- Consideration of the likely below ground conditions in relation to groundwater movement where it is not possible to physically see or measure all parts of the groundwater system. In this instance, it is necessary to make an assessment of the likely conditions based on professional knowledge and experience.
- There is normally a requirement to interpolate data where monitoring has been undertaken at spatially disparate points, at different depths, or as a series of spot measurements through time. Professional judgement is used to determine what is likely to be occurring between these spot measurements in space or time.
- Making an assessment of possible changes that may occur in measured parameters such as stream flow, water quality or groundwater level, based on a relatively short term data set, for example extrapolating a three-year baseline data set to a 60-year operational lifetime.
- Evaluating the potential effects of activities or parameters that cannot be measured or can only be measured with difficulty or at low accuracy. Professional judgement is then used to determine whether these are significant or not. An example might include assessing the flood risk from water pipe or sewer failure.
- Some environmental changes can only be seen over the very long term (many hundreds of years) and so judgement has to be used to assess the potential for significant changes associated with a relatively short term development (tens of years). In the case of fluvial geomorphology this might include assessing natural changes in river channel location or morphology from historical maps and applying this to possible future changes that could be induced by a new development.
- Where the criteria for the magnitude of change in table B8-12 need to be changed for site specific reasons professional judgement is used. An example is the quantitative assessment of water availability. The criteria used in table B8-12 is based on WFD UTAG [RD29] recommendations on the impacts of flow on the WFD status of watercourses. The WFD status applies to main rivers and larger watercourses, and therefore the criteria adopted from WFD UTAG is considered applicable only to larger watercourses. Where watercourses are considered too small by virtue of intermittent flow, the criteria for water availability in table B8-12 is not considered to be applicable as variable flow conditions between dry and flood conditions are an existing characteristic of the watercourse. In these cases, the magnitude of change on water availability is reduced one level to reflect specifically the potential influence on the timing of water availability.

8.4.34 In accordance with chapter B1 (Application Reference Number: 6.2.1), the significance of effect is determined with the inclusion of embedded mitigation

measures and good practice mitigation. Embedded mitigation includes measures that are integral to the development and are already incorporated within the current design. Good practice mitigation represents measures that are in line with legal compliance and industry good practice measures.

8.4.35 Where the first stage in the assessment identifies that there are likely to be significant effects, the potential for additional mitigation measures to reduce effects is identified.

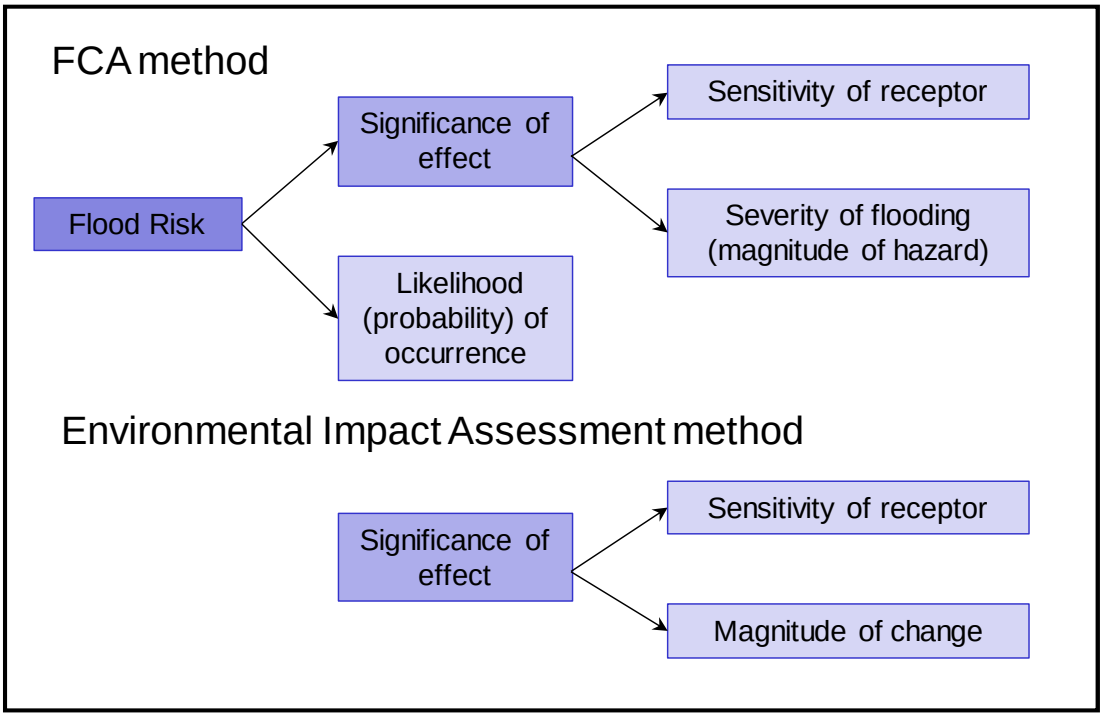
8.4.36 Any effects identified to be significant following implementation of embedded, good practice and additional mitigation, are referred to as residual effects.

Approach to assessment of significance for flood risk

8.4.37 An FCA has been undertaken for each relevant aspect of the development and this is provided as an appendix to each of chapter D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8). The method applied within the FCA to determine the significance of effect (which is informed by TAN 15 [RD4] as outlined in appendix D8-1.4 of the FCA, Application Reference Number: 6.4.29) differs from the methodology used for this Environmental Impact Assessment (as described above). The key differences relate to how the value of the receptor and the magnitude are assigned, which therefore drives slightly differing significances of effect. The FCA assigns the value of a receptor based on categories defined within TAN 15 that are specific to flood risk only and are not applicable to other aspects of surface water and groundwater. The FCA assigns an absolute magnitude to the flood hazard which includes, but is not confined to, the extent, depth and duration of flooding, and the velocity of flood waters. The Environmental Impact Assessment only considers the change to the flood risk that would be caused by the development.

8.4.38 In addition to the difference outlined above, the FCA takes the assessment a stage further than the EIA in that it considers the likelihood of an event occurring as well as considering the sensitivity of receptor and magnitude of hazard. The flood risk in the FCA is therefore derived by combining the significance of effect with the likelihood of occurrence. The different methods are shown in figure B8-1 below.

Figure B8-1 Flowchart showing the difference between the FCA and EIA methods of assessing flood risk



8.4.39 In order to assess the flood risk consistently with other surface water and groundwater effects within this Environmental Statement, the assessment of flood risk in chapter D8 (Application Reference Number: 6.4.8), E8 (Application Reference Number: 6.5.8), F8 (Application Reference Number: 6.6.8), G8 (Application Reference Number: 6.7.8) and H8 (Application Reference Number: 6.8.8) only considers changes that would potentially be caused by the development. The assessment therefore assigns a magnitude of change to the risk of flooding to receptors based on the criteria in table B-12. The FCA is the key source of information for this assessment. However, given the difference in methods between the FCA and the Environmental Statement, the magnitude of change within this assessment is not directly comparable to the magnitude of hazard or flood risk within the FCA appended to each chapter. Nevertheless, whilst the significance of effect may vary between the FCA and the Environmental Statement, the overall conclusions are consistent (i.e. significant or not significant effect).

Nature of effect

8.4.40 In addition to determining the significance of the effect, the assessment process also includes a qualitative description regarding the nature of the effect. The definitions used are as shown in table B8-13 and these terms add additional information about how the effect would affect receptors.

Table B8-13 Nature of effect definitions

Term	Description
Adverse	An effect which has the potential to decrease receptor value or status relative to baseline conditions.
Beneficial	An effect which has the potential to increase receptor value or status relative to baseline conditions.
Temporary	This is a reversible effect where recovery is possible and for which effects would persist only in the short or medium term.
Short-term	Effects which are confined to the phase of works (construction or decommissioning) such as temporary water emissions from working areas; or for the operation phase, effects that would persist for less than five years.
Medium-term	Effects which may persist after approximately three years until additional mitigation measures become effective.
Long-term	Effects which are permanent (irreversible) or which may decline over longer timescales, but would still persist after a specified 'design year'.

DMRB assessment methodology for the A5025 Off-line Highway Improvements

8.4.41 The assessment reported for the A5025 Off-line Highway Improvements has been undertaken in accordance with the guidance provided in DMRB Volume 11, Section 3, Part 10 (HD 45/09): Road Drainage and the Water Environment [RD26], referred to here as DMRB HD45/09. The level of significance of a potential effect upon the existing baseline condition of the surface water environment is determined by the sensitivity of the surface water feature combined with the magnitude of effect. This assessment takes account of general and specific potential effects from construction and/or operational activities, both before and after the application of mitigation measures.

8.4.42 The sensitivity and magnitude criteria used in chapter G8 (Application Reference Number: 6.4.8) represent a development of those provided within DMRB HD45/09 Annex IV. They are used to assess the severity of potential effects of proposed road improvements upon the hydrology and flood risk, water quality and fluvial geomorphology.

Hydrology and flood risk

8.4.43 The assessment of potential effects of the proposed scheme on hydrology and flood risk has considered changes to the flow of water above the ground surface and within associated water features. These are intrinsically linked to hydrogeology, water quality and quantity (with respect to flood risk), geomorphology and ecology (in particular, aquatic or water-dependent ecological receptors).

Fluvial geomorphology

8.4.44 The assessment of potential effects on fluvial geomorphology includes consideration of both upstream and downstream changes in the bed substrate, fluvial and geomorphological processes (including erosion, transport and deposition of sediment) both within the channel and adjacent floodplain habitats.

8.4.45 In the absence of specific methodologies for the assessment of fluvial geomorphological effects with respect to road developments, standard good practice and professional judgement have been used to assess fluvial geomorphological effects.

Water quality

8.4.46 The assessment of potential effects on baseline water quality includes the sub-attributes of water availability/quality, dilution and removal of waste products and biodiversity, as specified within DMRB HD45/09.

8.4.47 Method A of DMRB HD 45/09, employed using Highways Agency Water Risk Assessment Tool, has been developed to assess the magnitude of potential short-term effects of routine runoff on surface waters.

Limitations

8.4.48 For the Wylfa Newydd Development Area, data collection has endeavoured to obtain information on the hydrological system over the last few years to represent the changes that can occur due to seasonal variations. However, due to occasional equipment failures or land access constraints, it was not always possible to collect a full time-series dataset during the monitoring period (see the Wylfa Newydd Development Area hydrology and hydrogeology baseline reports in appendices D8-1, Application Reference Number: 6.4.26 and D8-3, Application Reference Number: 6.4.28 for further details). However, it is considered that this has not significantly affected the assessment and in some cases, other studies, such as modelling studies, provide data to fill the gaps.

8.4.49 The assessment of the baseline uses data collected over a time period which may not be representative of the long-term weather conditions or inclusive of extreme events (such as intense rain storms or longer-term drought conditions). It is often these extreme events that affect the freshwater environment the most. These conditions, however, are considered based on modelling studies when considering flood risk and potential changes brought about by changes to groundwater levels.

8.4.50 Data collection within and around the Cae Gwyn SSSI adjacent to the Wylfa Newydd Development Area has been limited due to access restrictions and the nature of the site, with access for drilling equipment to install boreholes being difficult without causing damage to the SSSI. However, as identified in the Cae Gwyn hydroecological assessment (appendix D8-6, Application Reference Number: 6.4.31), this has not significantly affected the assessment for this wetland feature.

8.4.51 Baseline data collection for all of the Associated Development and the Off-Site Power Station Facilities has largely relied on publicly available information and this has been taken at face value.

8.5 References

Table B8-14 Schedule of references

ID	Reference
RD1	Department of Energy and Climate Change. 2011. *Overarching National Policy Statement for Energy (EN-1)* (NPS EN-1). London: The Stationery Office.
RD2	Department of Energy and Climate Change. 2011. *National Policy Statement for Nuclear Power Generation (EN-6)* (NPS EN-6). London: The Stationery Office.
RD3	Welsh Government. 2016. *Planning Policy Wales* (Edition 9). [Online]. [Accessed: 30 June 2017]. Available from: http://gov.wales/docs/desh/publications/161117planning-policy-wales-edition-9-en.pdf.
RD4	Welsh Assembly Government. 2004. *Technical Advice Note 15: Development and Flood Risk*. [Online]. [Accessed: 30 June 2017]. Available from: http://gov.wales/docs/desh/publications/040701tan15en.pdf.
RD5	Welsh Assembly Government. 2009. *Technical Advice Note 5: Nature Conservation and Planning*. [Online]. [Accessed: 30 June 2017]. Available from: http://gov.wales/docs/desh/policy/100730tan5en.pdf.
RD6	Welsh Office. 1998. *Technical Advice Note 14: Coastal Planning*. [Online] [Accessed: 30 June 2017] Available from: http://gov.wales/docs/desh/publications/110805tan14en.pdf.
RD7	Isle of Anglesey County Council and Gwynedd Council. 2017. *Anglesey and Gwynedd Joint Local Development Plan 2011 - 2026 - Written Statement*. [Online]. [Accessed: 30 June 2017]. Available from: http://www.anglesey.gov.uk/Journals/j/v/e/Anglesey-and-Gwynedd-Joint-Local-Development-Plan---Written-Statement.pdf
RD8	Isle of Anglesey County Council. 2014. *New Nuclear Build at Wylfa: Supplementary Planning Guidance*. [Online]. [Accessed: 30 June 2017]. Available from: http://www.anglesey.gov.uk/Journals/2014/08/11/q/k/h/Wylfa-NNB-SPG-Adopted-July-2014.pdf.
RD9	UK Technical Advisory Group on the Water Framework Directive. 2012. *Paper 11b(i) Groundwater Chemical Classification for the purposes of the Water Framework Directive and the Groundwater Directive*. [Online]. [Accessed: 30 June 2017]. Available from: https://www.wfduk.org/sites/default/files/Media/Assessing%20the%20status%20of%20the%20water%20environment/UKTAG%20Paper%2011b%28i%29%20-%20Guidance%20on%20Groundwater%20Chemical%20Classification_FINAL_2802121%20v2.pdf

ID	Reference
RD10	UK Technical Advisory Group on the Water Framework Directive. 2012. *Paper 11b(ii): Groundwater Quantitative Classification for the purposes of the Water Framework Directive*. [Online]. [Accessed: 30 June 2017]. Available from: https://www.wfduk.org/sites/default/files/Media/Assessing%20the%20status%20of%20the%20water%20environment/UKTAG%20Paper%2011b%28ii%29%20-%20Guidance%20on%20Groundwater%20Quantitative%20Classification_FINAL_280212%20v2.pdf
RD11	Met Office. 2017. *UK Climate Projections* (UKCP) 09. [Online]. [Accessed: 30 June 2017]. Available from: http://ukclimateprojections.metoffice.gov.uk/21684
RD12	Welsh Government. 2016. *CL-03-16 Climate change allowances for planning*. [Online]. [Accessed: 30 June 2017]. Available from: http://gov.wales/docs/desh/publications/160823-cl-03-16-climate-change-allowances-for-planning-en.pdf
RD13	Environment Agency. 2017. *The Environment Agency's approach to groundwater protection.* [Online]. [Accessed: 30 June 2017]. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/620438/LIT_7660.pdf
RD14	Natural Resources Wales. 2017. *Protecting groundwater. Our role in managing and protecting groundwater.* [Online]. [Accessed: 30 June 2017]. Available from: https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/protecting-groundwater/?lang=en
RD15	NRW, SEPA, NIEA. 2017 Net Regs. Guidance for Pollution Prevention. [Online]. [Accessed: 27 June 2017]. Available from: http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/
RD16	Welsh Government. 2015. *Water Strategy for Wales*. [Online]. [Accessed: 30 June 2017]. Available from: http://gov.wales/docs/desh/publications/150521-water-strategy-for-wales-en.pdf
RD17	Venables, R., Newton, J., Westaway, N., Venables, J., Castle, P., Neale, B., Short, D., McKenzie, J., Leach, A., Housego, D., Chapman, J. and Peirson-Hills, A. 2000. *Environmental handbook for building and civil engineering projects. Part 1: Design and specification* (C512). London: CIRIA.
RD18	Venables, R., Newton, J., Westaway, N., Venables, J., Castle, P., Neale, B., Short, D., McKenzie, J., Leach, A., Housego, D.,

ID	Reference
	Chapman, J. and Peirson-Hills, A. 2000. *Environmental handbook for building and civil engineering projects. Part 2: Construction phase* (C528). London: CIRIA.
RD19	Venables, R., Newton, J., Westaway, N., Venables, J., Castle, P., Neale, B., Short, D., McKenzie, J., Leach, A., Housego, D., Chapman, J. and Peirson-Hills, A. 2000. *Environmental handbook for building and civil engineering projects. Part 3: Demolition and site clearance* (C529). London: CIRIA.
RD20	Masters-Williams, H., Heap, A., Kitts, H., Greenshaw, L., Davis, S., Fisher, P., Hendrie, M. and Owens, D. 2001. *Control of water pollution from construction sites. Guidance for consultants and contractors* (C532). London: CIRIA.
RD21	Charles, P. and Edwards, P. (eds.) 2015. *Environmental good practice on site guide* (fourth edition) (C741). London: CIRIA.
RD22	McIntyre, N. and Thorne, C. (eds.) 2013. *Land use management effects on flood flows and sediment – guidance on prediction* (C719D). London: CIRIA.
RD23	Woods Ballard. B, Wilson S., Udale-Clarke H., Illman S., Scott T., Ashley R. and Kellagher R. 2015. *The SuDS Manual* (C753). London: CIRIA.
RD24	J. W. Lancaster, M. Preene, C. T. Marshall. 2004. *Development and flood risk – guidance for the construction industry (*C624) London: CIRIA.
RD25	Balkham, M., Fosbeary, C., Kitchen, A. and Rickard, C. 2010. *Culvert Design and Operating Guide* (C689). London: CIRIA.
RD26	The Highways Agency, Transport Scotland, Welsh Assembly Government and The Department for Regional Development Northern Ireland. 2009. *Design Manual for Roads and Bridges*. Volume 11, Section 3, Part 10: Road Drainage and the Water Environment (HD45/09). London: The Stationery Office.
RD27	The Highways Agency, Transport Scotland, Welsh Assembly Government and The Department for Regional Development Northern Ireland. 2006. *Design Manual for Roads and Bridges* (DMRB) Interim Advice Note 81/06, Volume 11 Section 2, Part 5, Assessment and Management of Environmental Effects. London: The Stationery Office.
RD28	NRW. 2014. *How to Comply with Your Environmental Permit*. Version 8. [Online]. [Accessed: 16 June 2017]. Available from: http://naturalresources.wales/media/2110/how-to-comply-with-your-environmental-permit.pdf

ID	Reference
RD29	UK Technical Advisory Group on the Water Framework Directive. 2014. Updated Recommendations on Environmental Standards, River Basin Management (2015-21).
RD30	UK Technical Advisory Group. 2014. *Technical report on groundwater dependent terrestrial ecosystem (GWDTE) threshold values*. Version 9. [Online]. [Accessed: 16 May 2017]. Available from: https://www.wfduk.org/sites/default/files/Media/Environmental%20standards/WTT%20technical%20report%20on%20wetland%20chemical%20threshold%20values%20final_v9.pdf

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